ORDER No. PACD011001C2

Service Manual

Urban Multi

UM Series Using R-407C

Inverter	**MX1R Series**
Heat Recovery	**ME1R Series**
Combination	**MA1R Series**

UM Series Using R-22

Inverter	**MX1 Series**
Heat Recovery	**ME1 Series**

⚠ WARNIING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by ⚠ in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacture's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacture.

Specifications are subject to change without notice for further improvement.

Panasonic

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1. Introduction

1.1 Safety Cautions

Cautions and Warnings

- Be sure to read the following safety cautions before conducting repair work.
- The caution items are classified into " ⚠ **Warning**" and " ⚠ **Caution**". The " ⚠ **Warning**" items are especially important since they can lead to death or serious injury if they are not followed closely. The " ⚠ **Caution**" items can also lead to serious accidents under some conditions if they are not followed. Therefore, be sure to observe all the safety caution items described below.
- About the pictograms

  △ This symbol indicates an item for which caution must be exercised.
  The pictogram shows the item to which attention must be paid.

  ◯ This symbol indicates a prohibited action.
  The prohibited item or action is shown inside or near the symbol.

  ● This symbol indicates an action that must be taken, or an instruction.
  The instruction is shown inside or near the symbol.
- After the repair work is complete, be sure to conduct a test operation to ensure that the equipment operates normally, and explain the cautions for operating the product to the customer

1.1.1 Cautions in Repair

⚠ Warning	
Be sure to disconnect the power cable plug from the plug socket before disassembling the equipment for a repair. Working on the equipment that is connected to a power supply can cause an electrical shook. If it is necessary to supply power to the equipment to conduct the repair or inspecting the circuits, do not touch any electrically charged sections of the equipment.	
If the refrigerant gas discharges during the repair work, do not touch the discharging refrigerant gas. The refrigerant gas can cause frostbite.	
When disconnecting the suction or discharge pipe of the compressor at the welded section, release the refrigerant gas completely at a well-ventilated place first. If there is a gas remaining inside the compressor, the refrigerant gas or refrigerating machine oil discharges when the pipe is disconnected, and it can cause injury.	
If the refrigerant gas leaks during the repair work, ventilate the area. The refrigerant gas can generate toxic gases when it contacts flames.	
The step-up capacitor supplies high-voltage electricity to the electrical components of the outdoor unit. Be sure to discharge the capacitor completely before conducting repair work. A charged capacitor can cause an electrical shock.	
Do not start or stop the air conditioner operation by plugging or unplugging the power cable plug. Plugging or unplugging the power cable plug to operate the equipment can cause an electrical shock or fire.	

⚠ Caution	
Do not repair the electrical components with wet hands. Working on the equipment with wet hands can cause an electrical shock.	
Do not clean the air conditioner by splashing water. Washing the unit with water can cause an electrical shock.	
Be sure to provide the grounding when repairing the equipment in a humid or wet place, to avoid electrical shocks.	
Be sure to turn off the power switch and unplug the power cable when cleaning the equipment. The internal fan rotates at a high speed, and cause injury.	
Do not tilt the unit when removing it. The water inside the unit can spill and wet the furniture and floor.	
Be sure to check that the refrigerating cycle section has cooled down sufficiently before conducting repair work. Working on the unit when the refrigerating cycle section is hot can cause burns.	
Use the welder in a well-ventilated place. Using the welder in an enclosed room can cause oxygen deficiency.	

1.1.2 Cautions Regarding Products after Repair

⚠ Warning	
Be sure to use parts listed in the service parts list of the applicable model and appropriate tools to conduct repair work. Never attempt to modify the equipment. The use of inappropriate parts or tools can cause an electrical shock, excessive heat generation or fire.	
When relocating the equipment, make sure that the new installation site has sufficient strength to withstand the weight of the equipment. If the installation site does not have sufficient strength and if the installation work is not conducted securely, the equipment can fall and cause injury.	
Be sure to install the product correctly by using the provided standard installation frame. Incorrect use of the installation frame and improper installation can cause the equipment to fall, resulting in injury.	For integral units only
Be sure to install the product securely in the installation frame mounted on a window frame. If the unit is not securely mounted, it can fall and cause injury.	For integral units only
Be sure to use an exclusive power circuit for the equipment, and follow the technical standards related to the electrical equipment, the internal wiring regulations and the instruction manual for installation when conducting electrical work. Insufficient power circuit capacity and improper electrical work can cause an electrical shock or fire.	
Be sure to use the specified cable to connect between the indoor and outdoor units. Make the connections securely and route the cable properly so that there is no force pulling the cable at the connection terminals. Improper connections can cause excessive heat generation or fire.	

Warning	
When connecting the cable between the indoor and outdoor units, make sure that the terminal cover does not lift off or dismount because of the cable. If the cover is not mounted properly, the terminal connection section can cause an electrical shock, excessive heat generation or fire.	
Do not damage or modify the power cable. Damaged or modified power cable can cause an electrical shock or fire. Placing heavy items on the power cable, and heating or pulling the power cable can damage the cable.	
Do not mix air or gas other than the specified refrigerant (R22) in the refrigerant system. If air enters the refrigerating system, an excessively high pressure results, causing equipment damage and injury.	
If the refrigerant gas leaks, be sure to locate the leak and repair it before charging the refrigerant. After charging refrigerant, make sure that there is no refrigerant leak. If the leak cannot be located and the repair work must be stopped, be sure to perform pump-down and close the service valve, to prevent the refrigerant gas from leaking into the room. The refrigerant gas itself is harmless, but it can generate toxic gases when it contacts flames, such as fan and other heaters, stoves and ranges.	
When replacing the coin battery in the remote controller, be sure to disposed of the old battery to prevent children from swallowing it. If a child swallows the coin battery, see a doctor immediately.	

Caution	
Installation of a leakage breaker is necessary in some cases depending on the conditions of the installation site, to prevent electrical shocks.	
Do not install the equipment in a place where there is a possibility of combustible gas leaks. If a combustible gas leaks and remains around the unit, it can cause a fire.	
Be sure to install the packing and seal on the installation frame properly. If the packing and seal are not installed properly, water can enter the room and wet the furniture and floor.	For integral units only

1.1.3 Inspection after Repair

Warning	
Check to make sure that the power cable plug is not dirty or loose, then insert the plug into a power outlet all the way. If the plug has dust or loose connection, it can cause an electrical shock or fire.	
If the power cable and lead wires have scratches or deteriorated, be sure to replace them. Damaged cable and wires can cause an electrical shock, excessive heat generation or fire.	
Do not use a joined power cable or extension cable, or share the same power outlet with other electrical appliances, since it can cause an electrical shock, excessive heat generation or fire.	

Caution	
Check to see if the parts and wires are mounted and connected properly, and if the connections at the soldered or crimped terminals are secure. Improper installation and connections can cause excessive heat generation, fire or an electrical shock.	

Caution	
If the installation platform or frame has corroded, replace it. Corroded installation platform or frame can cause the unit to fall, resulting in injury.	
Check the grounding, and repair it if the equipment is not properly grounded. Improper grounding can cause an electrical shock.	
Be sure to measure the insulation resistance after the repair, and make sure that the resistance is 1 Mohm or higher. Faulty insulation can cause an electrical shock.	
Be sure to check the drainage of the indoor unit after the repair. Faulty drainage can cause the water to enter the room and wet the furniture and floor.	

1.2 Survey of Possible UM Outdoor Units

UM outdoor units are available in 5 to 30HP format to precisely meet the needs of any building size.

Modular design enables UM outdoor units to be joined together in rows with an outstanding degree of uniformity. The design of the UM Inverter & heat recovery series is sufficiently compact to be taken to the top of building in a commercial elevator, overcoming site transportation problems.

Refrigerant	Type	Outdoor Unit	Maximum n° of Connectable indoor units						Range of Total Capacity Index
			8	13	16	20	30	32	
R-407C	Inverter	CU-5MX1SPP	○						62.5~162.5
		CU-8MX1SPP		○					100~260
		CU-10MX1SPP			○				125~325
	Heat Recovery	CU-8ME1XPK		○					100~260
		CU-10ME1XPK			○				125~325
	Combination Inverter	PA-16MA1XPK				○			200~520
		PA-18MA1XPK				○			225~585
		PA-20MA1XPK				○			250~650
		PA-24MA1XPK						○	300~780
		PA-26MA1XPK						○	325~845
		PA-28MA1XPK						○	350~910
		PA-30MA1XPK						○	375~975
R-22	Inverter	CU-5MX1SPE	○						62.5~162.5
		CU-8MX1SPE		○					100~260
		CU-10MX1SPE			○				125~325
	Heat Recovery	CU-8ME1XNA		○					100~260
		CU-10ME1XNA			○				125~325

1.3 Survey of Possible UM Indoor Units

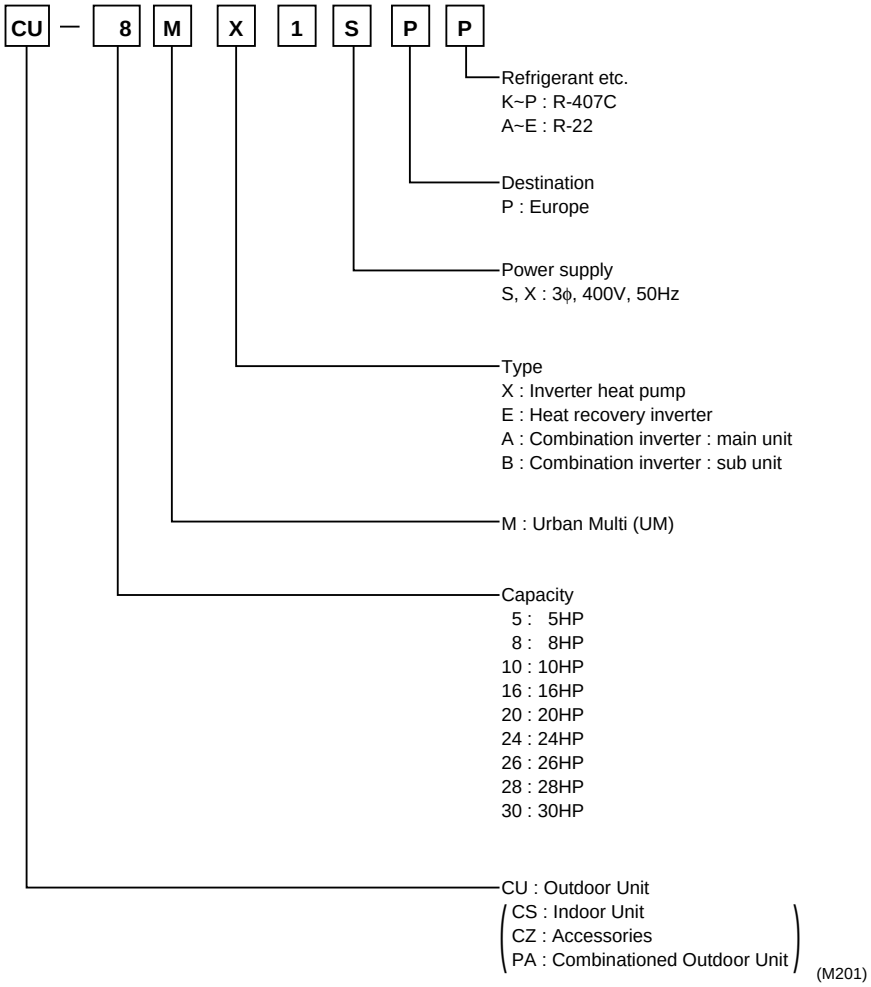
Refrigerant	Type	Model Name	Size									
			20	25	32	40	50	63	80	100	125	200	250
R-407C R-22	2-Way Cassette Type	CS-LMHPP	O	O	O	O	O	O	O	—	O	—	—
	4-Way Cassette Type	CS-UMHPP	O	O	O	O	O	O	O	O	O	—	—
	Corner Type	CS-DM1HPK	—	O	O	O	—	O	—	—	—	—	—
	Built-in Type	CS-FMHPP	O	O	O	O	O	O	O	O	O	—	—
	Small Duct Type	CS-NM1HPP	O	O	—	—	—	—	—	—	—	—	—
	Ducted Type	CS-EMHPK	—	—	—	O	O	O	O	O	O	O	O
	Ceiling Type	CS-TMJPL	—	—	O	—	—	O	—	O	—	—	—
	Wall Type	CS-KM1HPK	O	O	O	O	O	O	—	—	—	—	—
	Floor Standing Type	CS-PM1HPK	O	O	O	O	O	O	—	—	—	—	—
	Cancealed Floor Standing Type	CS-RM1HPK	O	O	O	O	O	O	—	—	—	—	—

Capacity Index	20	25	31.25	40	50	62.5	80	100	125	200	250

eg. Selected indoor units: CS-25LMHPP + CS-100LMHPP + CS-200EMHPK+ CS-40FMHPP
Connection ratio: 25 + 100 + 200 + 40 = 365
Possible outdoor unit: PA-16MA1XPK

1.4 Nomenclature

1.4.1 Outdoor Unit



1.4.2 Indoor Unit

(M200)

UM Series Using R-22

Inverter Heat Recovery MX1 Series ME1 Series

Part1
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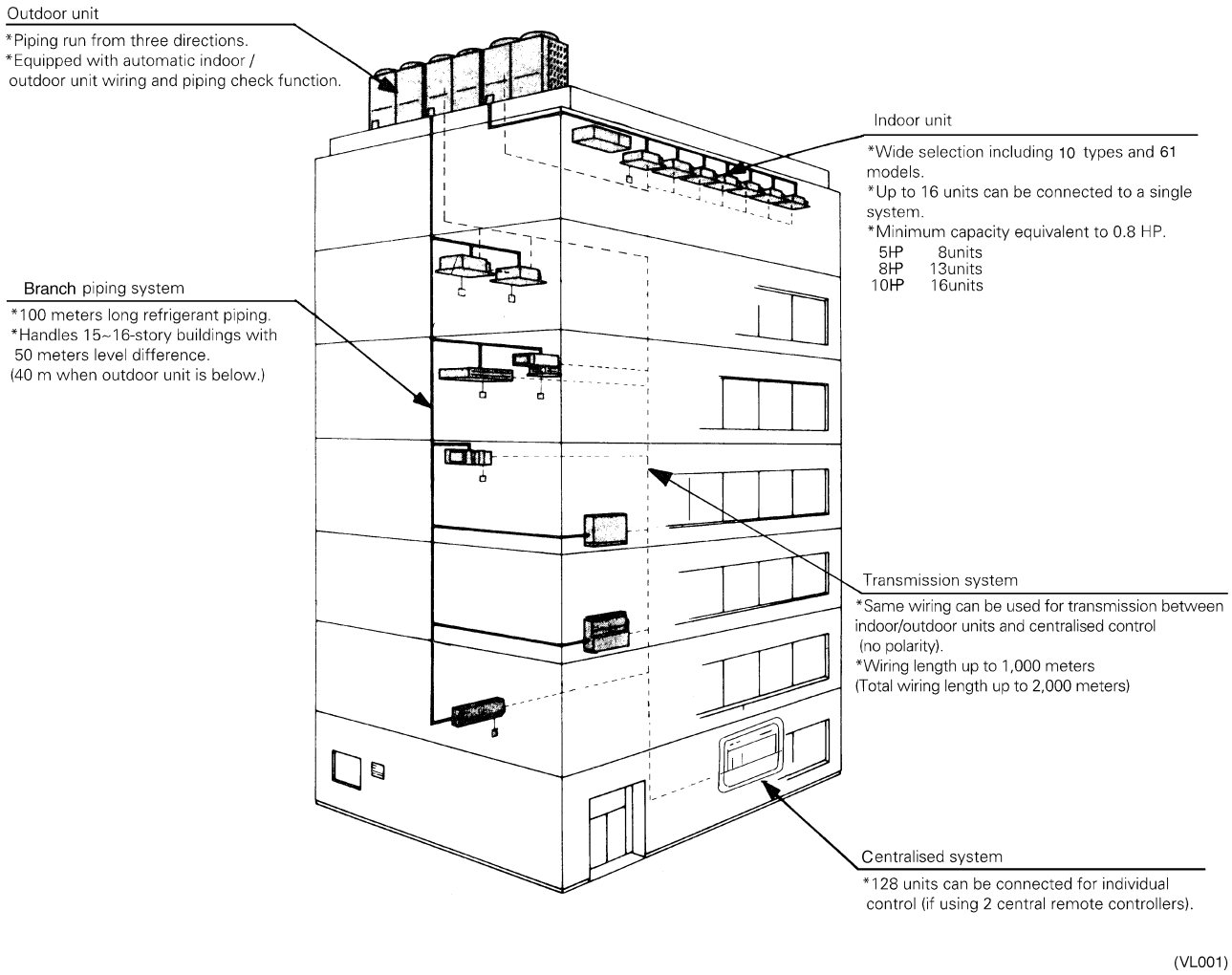
1. Outline of System

1.1 MX1 Series

1.1.1 Urban Multi Inverter MX1 Series System Outline


Outdoor unit
*Piping run from three directions.
*Equipped with automatic indoor / outdoor unit wiring and piping check function.
Indoor unit
*Wide selection including 10 types and 61 models.
*Up to 16 units can be connected to a single system.
*Minimum capacity equivalent to 0.8 HP.
5HP 8units
8HP 13units
10HP 16units
Branch piping system
*100 meters long refrigerant piping.
*Handles 15~16-story buildings with 50 meters level difference.
(40 m when outdoor unit is below.)
Transmission system
*Same wiring can be used for transmission between indoor/outdoor units and centralised control (no polarity).
*Wiring length up to 1,000 meters
(Total wiring length up to 2,000 meters)
Centralised system
*128 units can be connected for individual control (if using 2 central remote controllers).
(VL001)

1.2 Changes in “MX1” Series Functions / Parts

1.2.1 Changes in the System as a Whole

More outdoor units can be connected.

A maximum of 16 indoor units can now be connected to a single system.
5HP ..... 8 units
8HP ..... 13 units
10HP ..... 16 units

Same wiring can be used for transmission between indoor/ outdoor units and centralised control

Up to now, separate wiring was required for centralised control and for transmission between indoor/ outdoor units when installing optional controllers for centralised control, but now the same wiring can be used for both. This facilitates indoor/outdoor transmission wiring construction work as follows.

MX1 Series

- Same terminals used for input and output.
- No polarity.
- 3 wiring methods can be used (serial, bus and star wiring).
- Up to 16 branches can be used. (Cannot be branched again once branched.)
- System wiring can be up to a total of 2,000 meters.
  (Max. wiring length up to 1,000 meters).

■ Indoor unit terminal block

MX1 Series	Remote controller		Transmission wiring		External	
	N	P	F1	F2	T1	T2

■ Outdoor unit terminal block

MX1 Series	C / H selector			To In / D unit		To Out / D unit	
	A	B	C	F1	F2	F1	F2

2 central remote controller can be connected in a transmission system.

UM Inverter MX1 Series equipment can be connected with two central remote controllers, and can individual control 128 unit (64 units T 2) on a single transmission line.

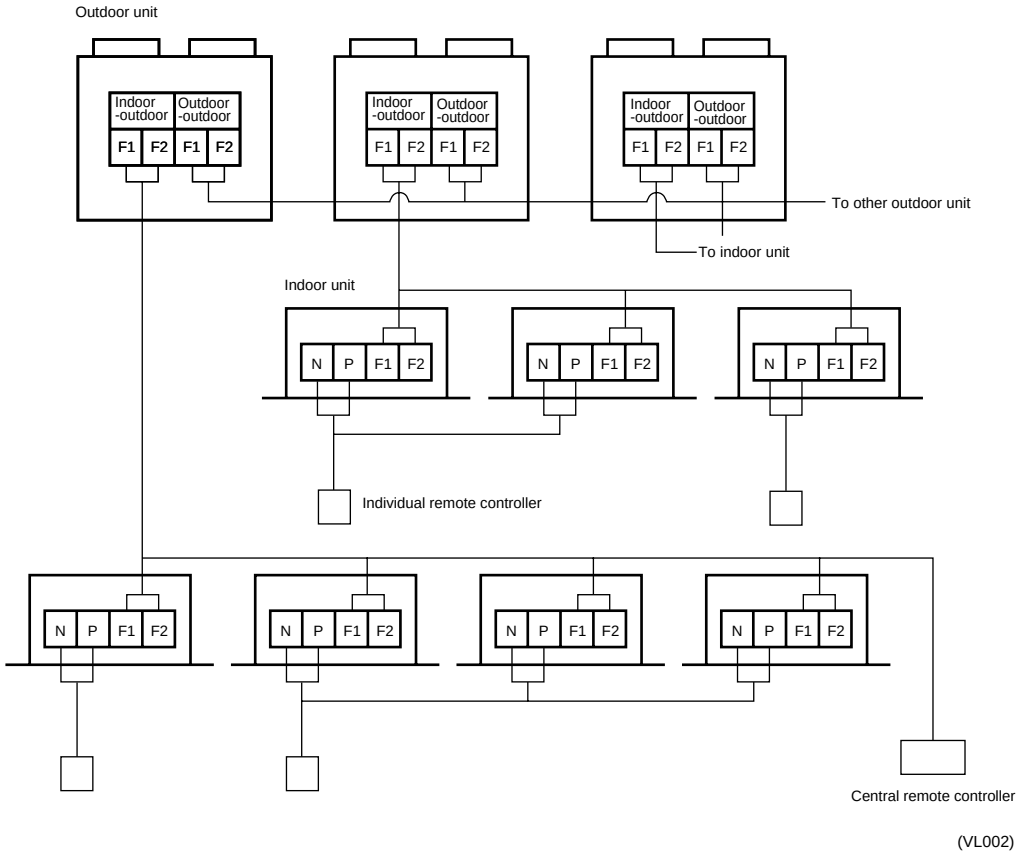
Change in Mode of Transmission Between Outdoor Units

Wiring for transmission between outdoor units is necessary for selecting cool or heat mode for several units at once. This transmission has been changed as follows.

MX1 Series

- Same terminals used for input and output.
- Sequential start requires only wiring between outdoor units and setting.
- Simultaneous cool/heat selection and low noise operation require a separate adaptor for outside control of outdoor units.
- Transmission can be conducted between a maximum of 10 units.
- Optional controllers for centralised control can be connected to a transmission line between outdoor units.

UM Inverter MX1 Series



1.2.2 Changes in Indoor Units

Drain Pump

When the TEST OPERATION button has been pushed in order to facilitate checking drainage when installing, the drain pump is force-operated regardless of the temperature control mode. If a humidifier is to be included in the setup, you must set to “Equipped humidifier” with the remote controller. (With the factory settings, the drain pump is not operated during heating.)

Swing Louver

The wall mounted type is equipped with a swing louver. The ceiling mounted cassette type can be set to prevent the ceiling from being soiled.

Able to Use Wireless Remote Controllers

The multi flow, double flow, ceiling suspended and wall mounted types can be fitted with a wireless remote controller kit.
(Other types can use a separate wireless remote controller.)

1.2.3 Changes in Outdoor Units

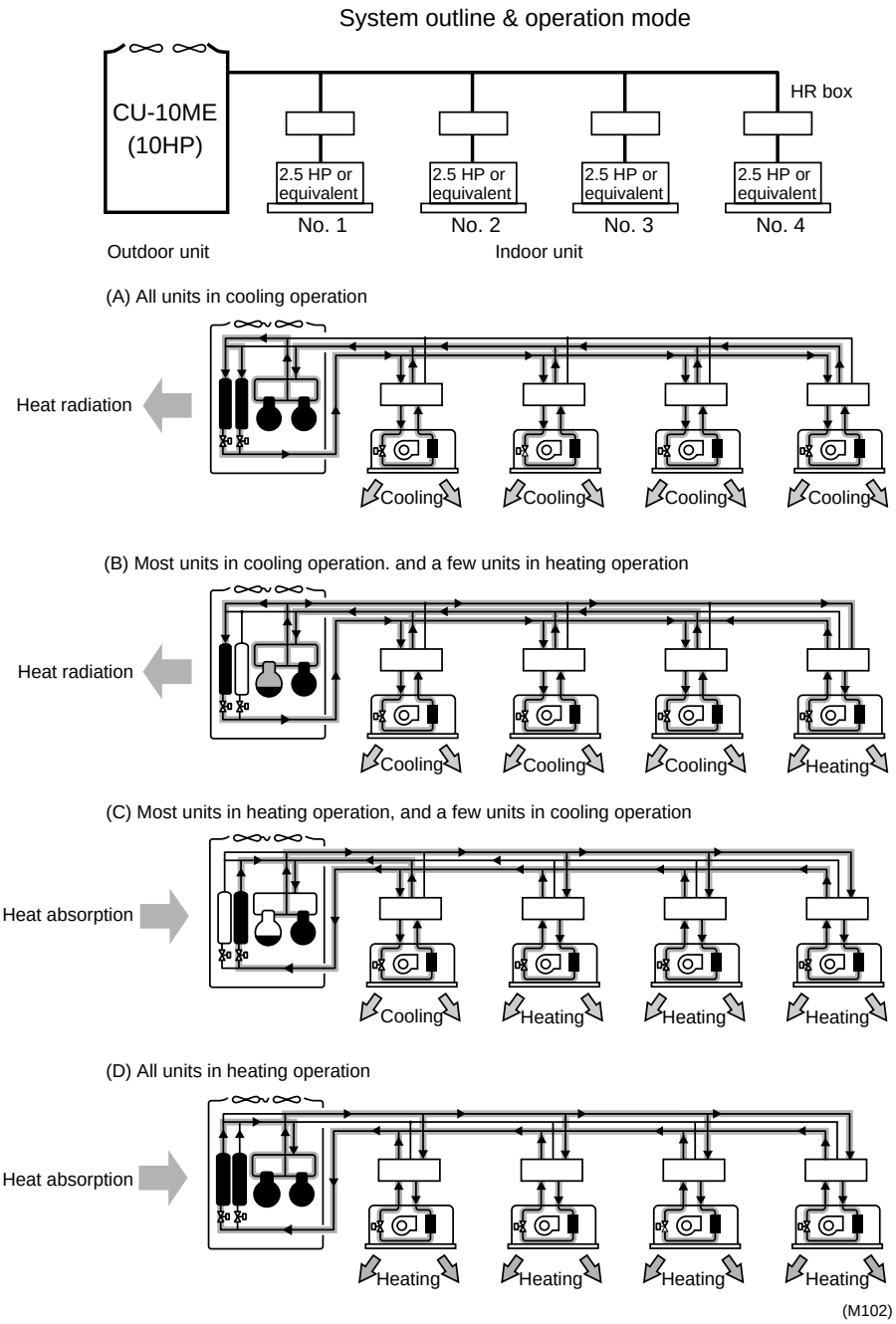
Equipped with Oil Temperature Sensor Thermistor (8 and 10HP)

Oil temperature detection has been incorporated into control in order to prevent wet operation and improve dilution of oil.

1.3 ME1 Series

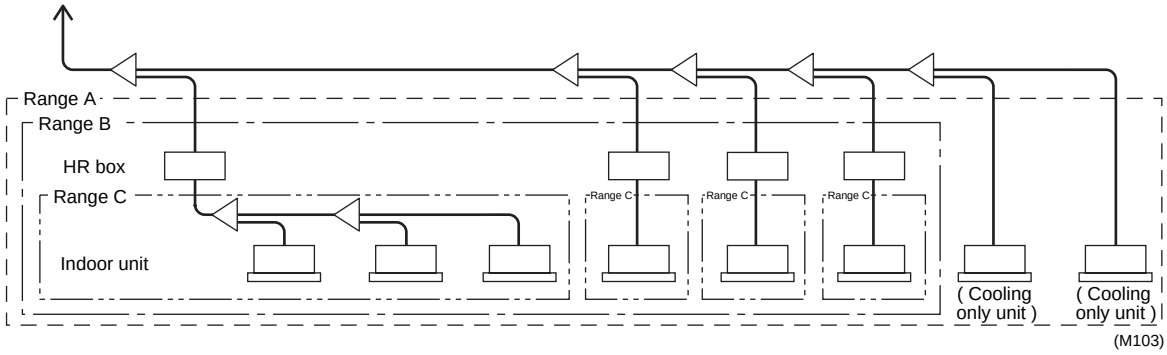
1.3.1 System Outline

- Allows individual control of different types of indoor units with varying capacities totaling 50 to 130% of the outdoor unit capacity.
  ∗ When total indoor capacity exceeds 100%, indoor unit operating capacity may decrease slightly if all indoor units are operated at the same time.
- Indoor units ranging from the smallest 20 type (0.8 HP).
- Flexible refrigerant piping: equivalent length of 125 m, actual length of 100 m, outdoor unit height difference of 50 m, and height difference of 15 m between indoor units.



∗ Outside temperature of 35°C for operation mode (A), 0°C for operation mode (D), and typical seasonal outside temperatures for others.

1.3.2 Allowed Range of Indoor Unit and HR Box Connection



■ Arrange systems to conform below conditions referring to above diagram.

Range	Item	Model of outdoor unit and HR box	Total capacity of connectable indoor units	Max. number of connectable indoor units
Range A	Total indoor unit capacity	CU-8ME1XPA	11.2 to 29.1kW	13 units
		CU-10ME1XPA	14 to 36.4kW	16 units
Range B	Total indoor unit capacity allowed for simultaneous cooling/heating operations	CU-8ME1XPA	11.2kW or more	13 units
		CU-10ME1XPA	14kW or more	16 units
Range C	Total indoor unit capacity allowed for connection to HR box	CZ-100HR1HE	less than 11.2kW	5 units or less
		CZ-160HR1HE	11.2 to 18kW	6 units or less

Part 2
Function

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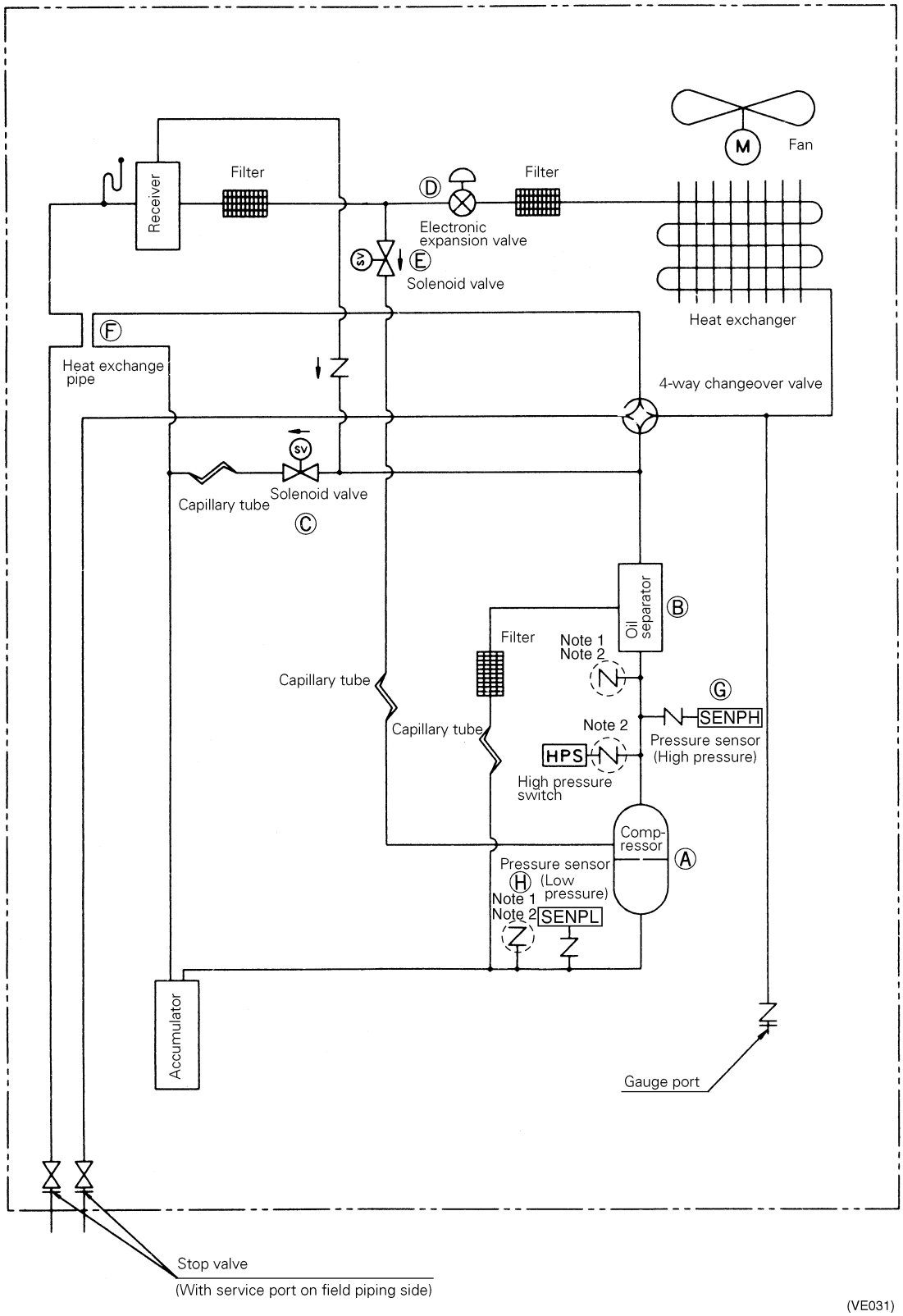
1. Function

1.1 Outdoor Unit Refrigerant System Diagram

1.1.1 CU-5MX1SPE



(VE031)

A. Compressor M1C
Scroll compressor that operates on 30~116Hz by inverter drive enables 13-step capacity control.
Capacity control is carried out for individual and linear control of indoor units.

B. Oil separator
The oil separator is a device that collects the oil discharged from the compressor.
The collected oil is constantly recycled to the compressor via capillary tube.

C. Solenoid valve (hot gas bypass) Y2S
Valve is opened by low pressure safety control when low pressure drops.
Balances high/low pressure when off in order to reduce load when the compressor starts.

D. Outdoor unit electronic expansion valve Y1E
Expansion valve when heating. Senses compressor suction pipe and low pressure equivalent saturated temperature, and carries out superheat degree control.

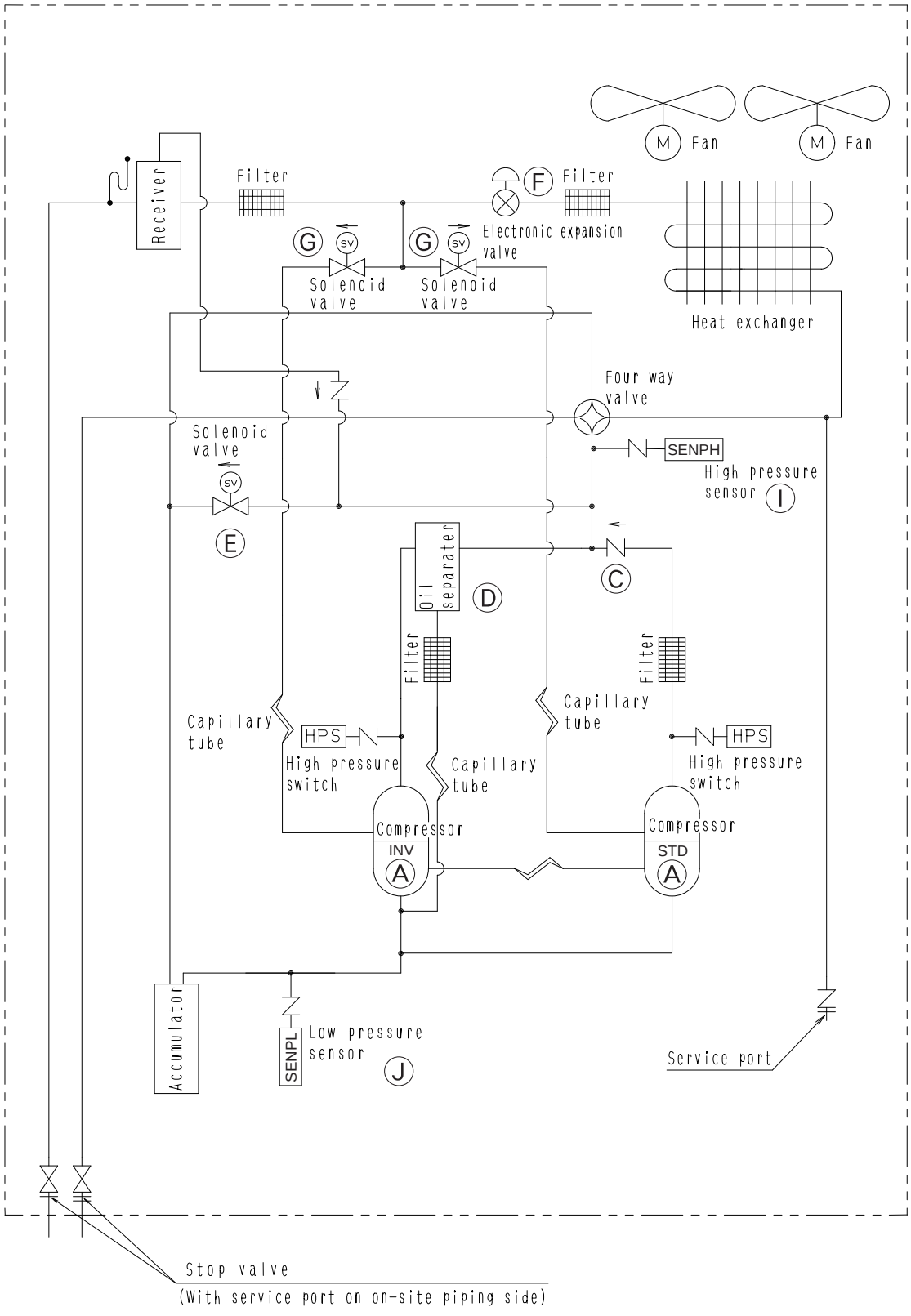
E. Solenoid valve (injection) Y3S
Controls injection in order to prevent overheating.

F. Heat exchange pipe
Subcooling so that refrigerant drift doesn't occur between indoor units when flash gas is produced in the liquid pipe.

G. Pressure sensor (high pressure, red) SENPH
Semiconductor pressure sensor for sensing the operating status of the indoor by refrigerant pressure which senses discharge pressure.

H. Pressure sensor (low pressure, blue) SENPL
Semiconductor pressure sensor for sensing the operating status of the indoor by refrigerant pressure which senses suction pressure.

1.1.2 CU-8·10MX1SPE



4D014597

A. Compressor M1C / M2C
Connecting a scroll compressor (inverter compressor) that operates on 30~116Hz by inverter drive and a scroll compressor (standard compressor) that runs on a commercial power supply to the same refrigerant system enables 21-step capacity control. Capacity control is carried out for individual and linear control of indoor units.
(M1C: Inverter compressor, M2C: Standard compressor)

C. Check valve
Keeps liquid refrigerant from collecting in the standard compressor when only the inverter compressor is running.

D. Oil separator
The oil separator is a device that collects the oil discharged from the compressor. The collected oil is constantly recycled to the compressor via capillary tube.

E. Solenoid valve (hot gas bypass) Y2S
Valve is opened by low pressure safety control when low pressure drops. Balances high/low pressure when off in order to reduce load when the compressor starts.

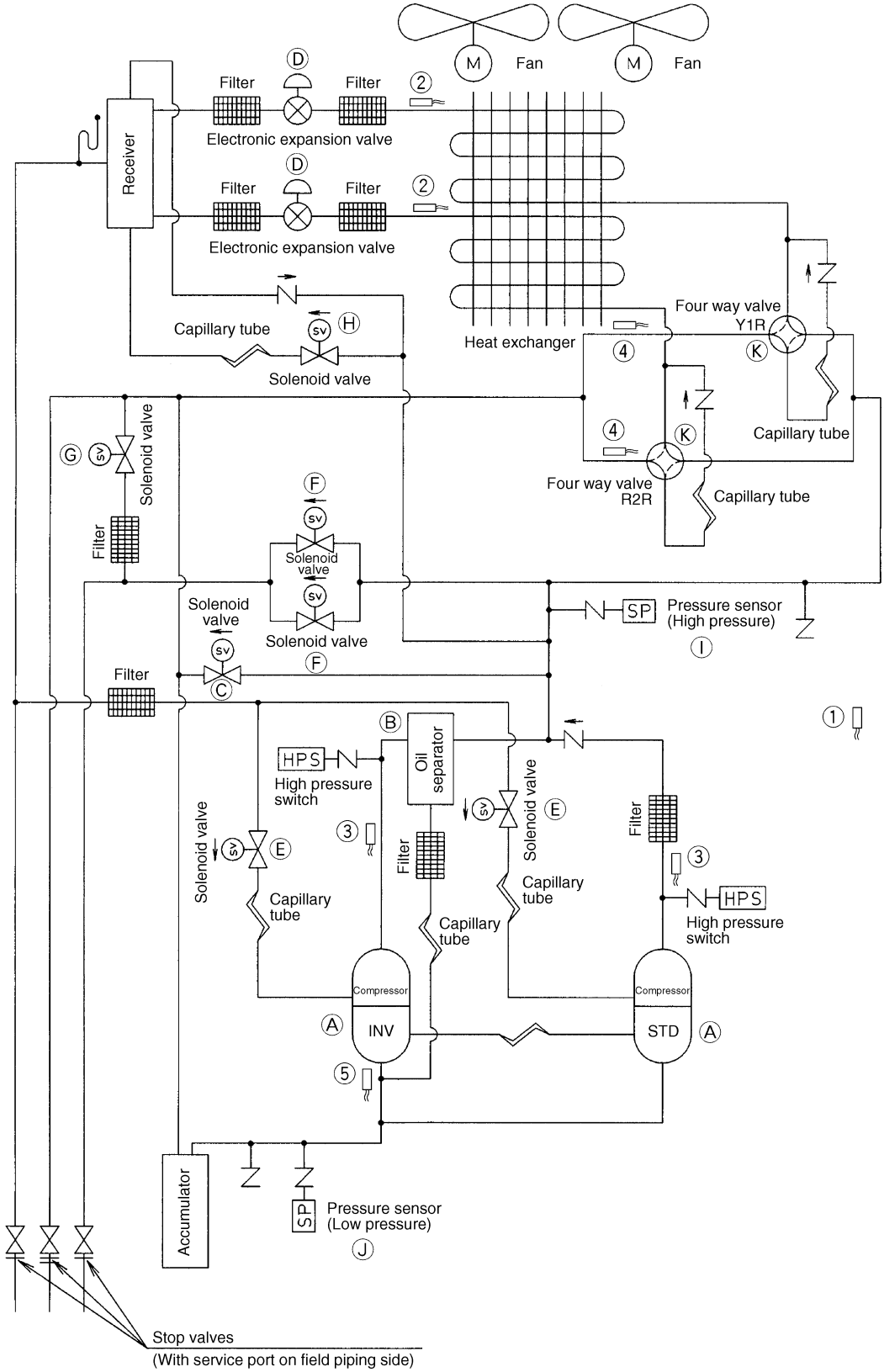
F. Outdoor unit electronic expansion valve Y1E
Expansion valve when heating. Senses compressor suction pipe and low pressure equivalent saturated temperature, and carries out superheat degree control.

G. Solenoid valve (injection) Y3S / Y4S
Controls injection in order to prevent overheating.
Y3S: Inverter compressor, Y4S: Standard compressor

I. Pressure sensor (high pressure, red) SENPH
Semiconductor pressure sensor for sensing the operating status of the indoor by refrigerant pressure which senses discharge pressure.

J. Pressure sensor (low pressure, blue) SENPL
Semiconductor pressure sensor for sensing the operating status of the indoor by refrigerant pressure which senses suction pressure.

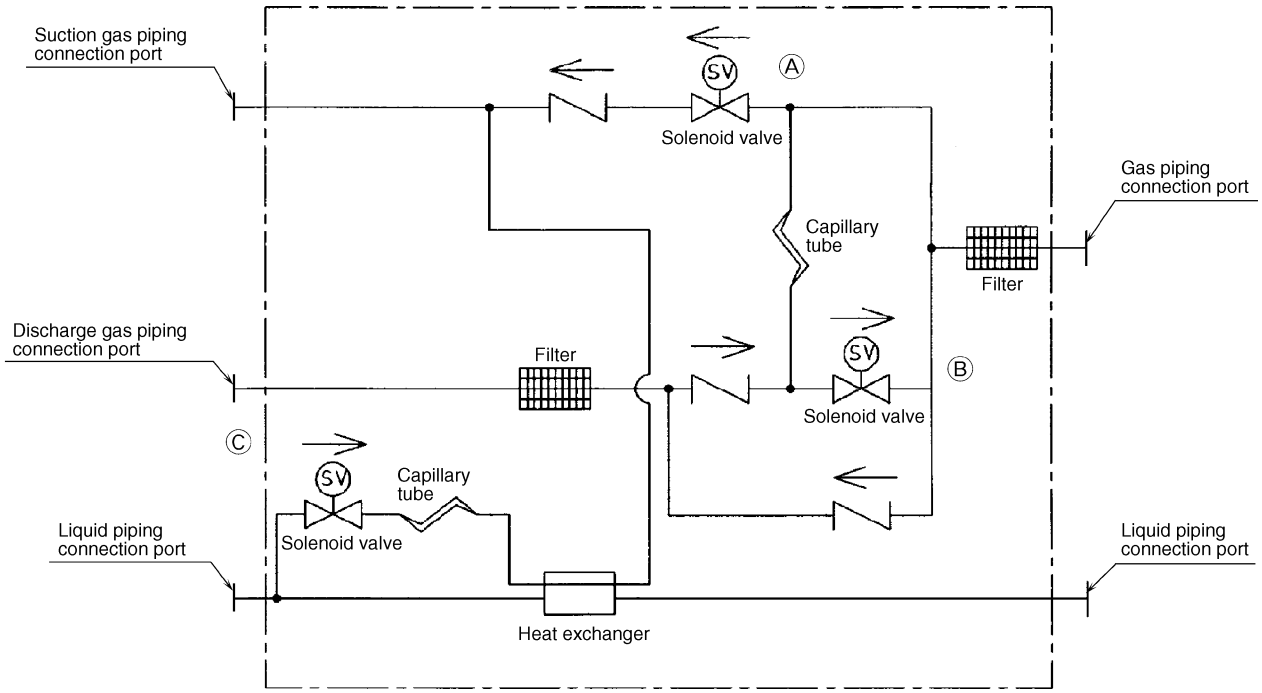
1.1.3 CU-8·10ME1XPA (Heat Recovery)



A. Compressor
The 20-step capacity control is achieved by the inverter scroll compressor that uses an inverter for frequency control in a range of 30 to 116 Hz and the standard scroll compressor that uses commercial power supply. The compressors allow individual control of indoor units and linear control.
(M1C : inverter compressor, M2C : standard compressor)
B. Oil separator
This device collects oil discharged from the compressors. The device receives oil and sends recovered oil to the compressors through the capillary tube.
C. Solenoid valve (for hot gas bypass) Y2S
This valve maintains balance between the high and low pressure sides when the equipment stops, thus reducing compressor load in the next startup.
This valve is activated by a low-pressure protection control function and opens when the low-pressure side decreases in pressure.
D. Outdoor unit electronic expansion valves Y1E, Y2E
These expansion valves are activated during heating operation.
They detect the compressor suction pipe temperature and low pressure equivalent saturation temperature and control superheat.
(Y1E : for primary-side heat exchanger, Y2E : for secondary-side heat exchanger)
E. Solenoid valve (injection) Y3S, Y4S
Controls injection solenoid valve ON-OFF in order to prevent overheating.
Y3S : for inverter side compressor
Y4S : for standard side compressor
F. Solenoid valve (discharge gas) Y5S, Y7S
Valve is opened during heating and simultaneous cooling and heating operations.
G. Solenoid valve (for pressure equalization) Y1S
This valve maintains pressure balance before and after the HR box solenoid valve during cooling and heating operation mode change.
H. Solenoid valve (for liquid pressure) Y6S
This valve opens a bypass to send hot gas to the receiver and controls the liquid pressure.
I. Pressure sensor (high pressure ⋯ red) SENPH
This semiconductor pressure sensor detects discharge pressure. The detected refrigerant pressure is used to evaluate the operation conditions of indoor units.
Heating operation ⋯ The sensor detects high pressure and controls the compressor capacity.
J. Pressure sensor (low pressure ⋯ blue) SENPL
This semiconductor pressure sensor detects suction pressure. The detected refrigerant pressure is used to evaluate the operation conditions of indoor units.
Cooling operation ⋯ The sensor detects low pressure and controls the compressor capacity.
Heating operation ⋯ The sensor provides superheat control.
K. 4-way valves Y1R, Y2R
(Y1R : for primary-side heat exchanger, Y2R: for secondary-side heat exchanger)
1. Outside temperature thermistor R1T
Heating operation ⋯ Used as a function of defrost IN condition.
The thermostat turns off when the temperature exceeds 23°C.
2. Coil temperature thermistors R2-1T, R2-2T
(R2-1T : for primary-side heat exchanger, R2-2T : for secondary-side heat exchanger)
Cooling operation ⋯ Not used.
Heating operation ⋯ Used as a function of defrost IN condition, in combination with the outside temperature data.
3. Discharge temperature thermistors R3-1T, R3-2T
These thermistors are used for compressor discharge temperature protection.
(R3-1T : inverter compressor, R3-2T : standard compressor)
4. Suction pipe temperature thermistors R4-1T, R4-2T
These thermistors are used for compressor discharge temperature protection.
(R4-1T : for primary-side heat exchanger, R4-2T : for secondary-side heat exchanger)
5. Oil temperature thermistor R5T
During defrost and oil return operation, provides upper-limit frequency control to improve oil diluting condition.

1.1.4 HR Box

CZ-100HR1HE



A. Solenoid valve (suction side) Y2S
This solenoid valve turns ON when normal cooling operation and discharge/suction oil return operation. (Connect indoor unit gas pipe and outdoor unit suction pipe.)

B. Solenoid valve (discharge side) Y3S
Turn ON this valve to operate of discharge oil return when indoor unit is set for heating. (Connect indoor unit gas pipe and outdoor unit discharge pipe.)

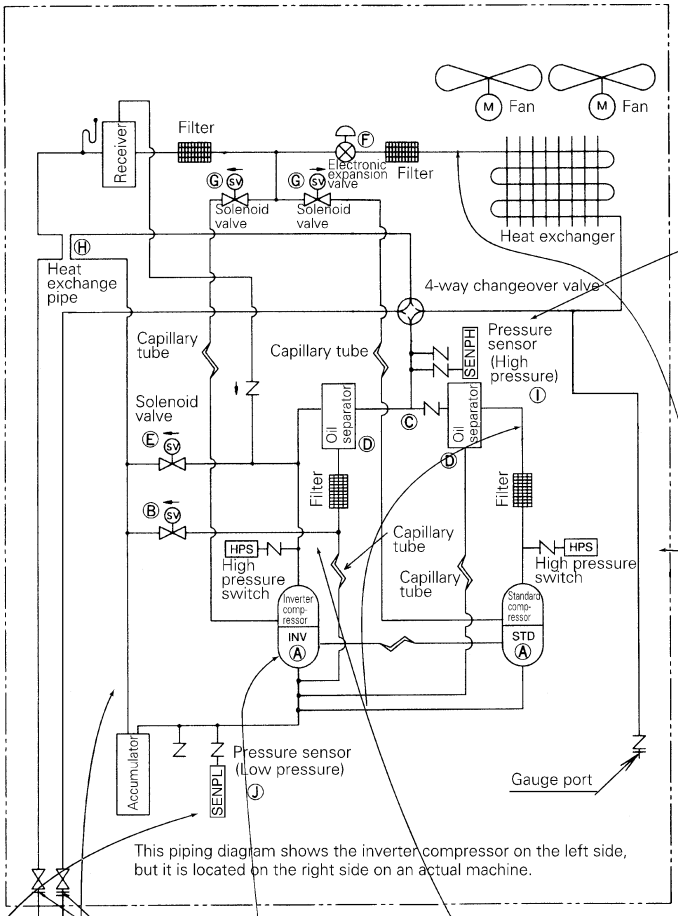
C. Solenoid valve (Drift prevention injection) Y1S
The only valve in HR box of which indoor unit is in heating operation when simultaneous cooling/heating operation is applied in the same system

∗ **Impossible to replace solenoid valve main body.**

1.1.5 Function of Thermistors and Pressure Sensors

Outdoor Unit

CU-8·10MX1SPE



High pressure sensor (SENPH)
When heating:
Used for compressor capacity control by sensing high pressure.
When cooling:
Carries out heat exchange control during low outdoor air cooling.

Outdoor temperature thermistor (R1T)
(When heating)
- Used as the function for defrost IN conditions.
- OFF by thermostat when temperature becomes 27°C or higher

Suction pipe temperature thermistor (R4T)
Used for superheat control of electronic expansion valve when heating.

Discharge pipe temperature thermistor
R3-1T (Inverter compressor)
R3-2T (Standard compressor)
Used for compressor discharge temperature safety.
(CU-5MX1 R3T)

Coil temperature thermistor (R2T)
(When cooling)
Not used for anything.
(When heating)
Used together with outdoor temperature as the function for defrost IN conditions.

Low pressure sensor (SENPL)
When cooling:
Used for compressor capacity control and low pressure safety control by sensing low pressure.
When heating:
Used for superheating control and low pressure safety control.

Oil temperature thermistor (R5T)
(8, 10 HP only)
(When heating)
- Alters the desired superheat degree (SH) to prevent wet operation.

(When defrosting)
- Controls upper limit frequency to improve dilution of oil.

1.2 List of Safety Devices and Functional Parts Setting Values

1.2.1 CU-5·8·10MX1SPE

Item	Symbol	Name			Type		
					CU-5MX1SPE	CU-8MX1SPE	CU-10MX1SPE
Compressor		Inverter side Model Output	3ϕ, 380~415V	INV	JT100BAVYE 3.5 kW	JT100BAVTYE 3.5 kW	JT100BAVTYE 3.5 kW
				STD		JT100BATYE 2.2 kW	JT160BATYE 3.75kW
		Compressor safety thermostat			Discharge pipe thermistor 135°C OFF		
	J1HC/ J2HC	Crank case heater			33W	33W+33W	
	F2C	Over-current relay	3ϕ, 380~415V		—	HOE-20F-TRA1 10A	HOE-20F-TRA1 13A
Safety device	Q1M Q2M	Fan motor			190W	140W+230W	
		Safety thermostat			Open 135°C ± 5°C	140W: Open 120 ± 5°C, 230W: 135 ± 5°C	
	S1P	Pressure switch (for high pressure safety)			20SP-688-6 OFF: 27.5+0~-1.0kg/cm² ON: 20.0+1.0~-1.0kg/cm²	—	
	S1PH	Pressure switch (for high pressure safety)			—	20SP-688-6 OFF: 27.5+0~-1.0kg/cm² ON: 20.0+1.0~-1.0kg/cm²	
	S2PH	Pressure switch (for high pressure safety)			—	20SP-688-6 OFF: 27.5+0~-1.0kg/cm² ON: 20.0+1.0~-1.0kg/cm²	
		Fusible plug			FPG-3D 70~75°C		
Sensor	SENPH	Pressure sensor			PS8030A 0~30kg/cm² (0~2.94MPa)		
	SENPL	Pressure sensor			PS8030A 0~10kg/cm² (0~0.98MPa)		
	R1T	Thermistor (for outdoor air)			3.5~360KΩ		
	R2T	Thermistor (for heat exchange)			3.5~360KΩ		
	R3T	Thermistor (for discharge pipe)			3.5~400KΩ	—	
	R3-1T	Thermistor (for inverter discharge pipe)			—	3.5~400KΩ	
	R3-2T	Thermistor (for standard discharge pipe)			—	3.5~400KΩ	
	R4T	Thermistor (for suction pipe)			3.5~360KΩ		
	R5T	Thermistor for inverter oil temperature)			—	3.5~400KΩ	
Other functions /parts	Y1E Note 1	Electronic expansion valve		When cooling	ON: 2,000 pulses (completely open); OFF: 0 pulses (completely closed)		
				When heating	ON: PI control; OFF: 0 pulses (completely closed)		
	Y2S	Solenoid valve (for hot gas bypass)			NEV603		
	Y3S	Solenoid valve (for inverter injection)			NEV202		
	Y4S	Solenoid valve (for standard injection)			—	NEV202	
	Y1S Note 1	Solenoid valve (pressure equalizing)			—	NEV202	

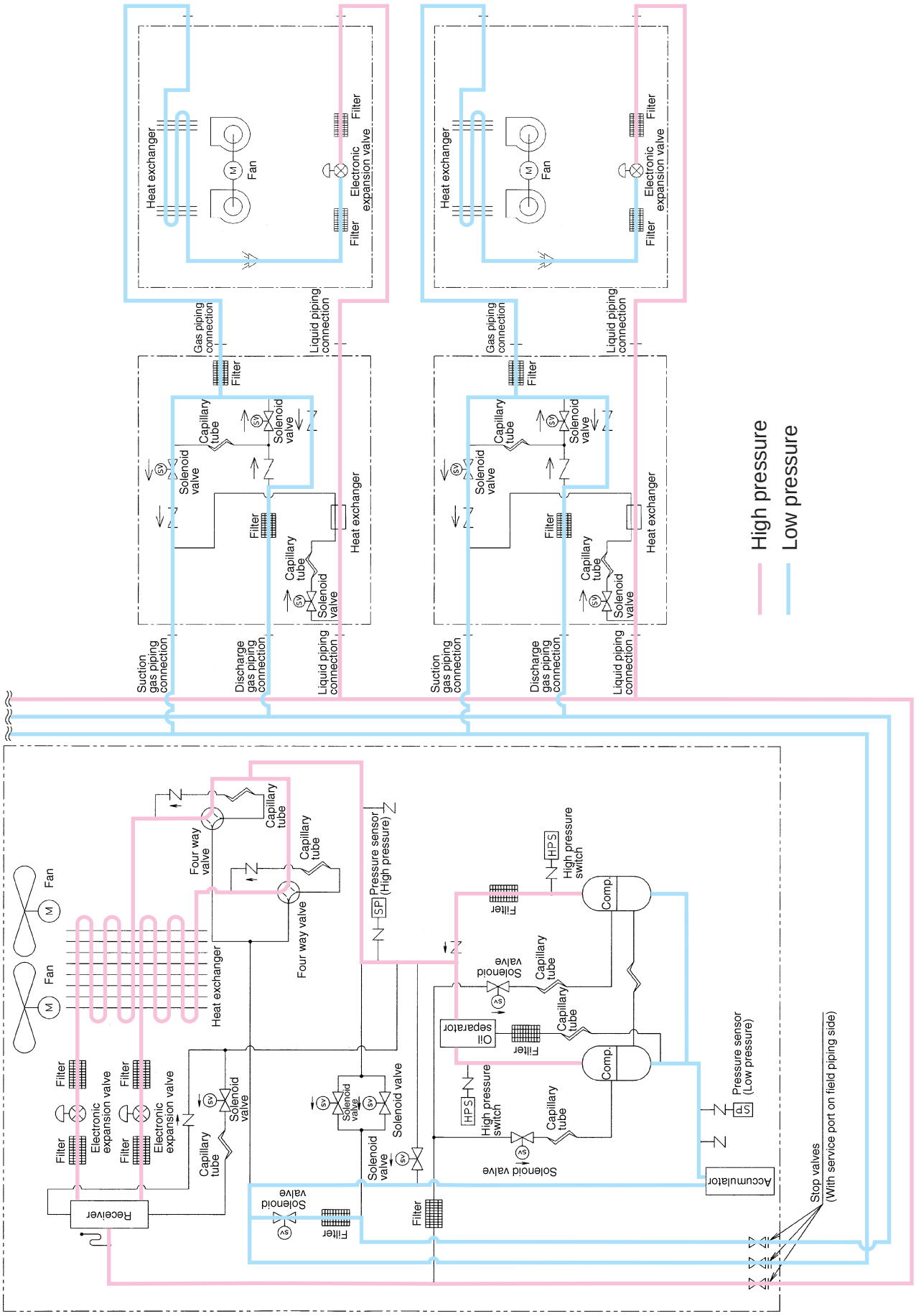
Note 1. These parts are for heat pump model only.

1.2.2 CU-8·10ME1XPA

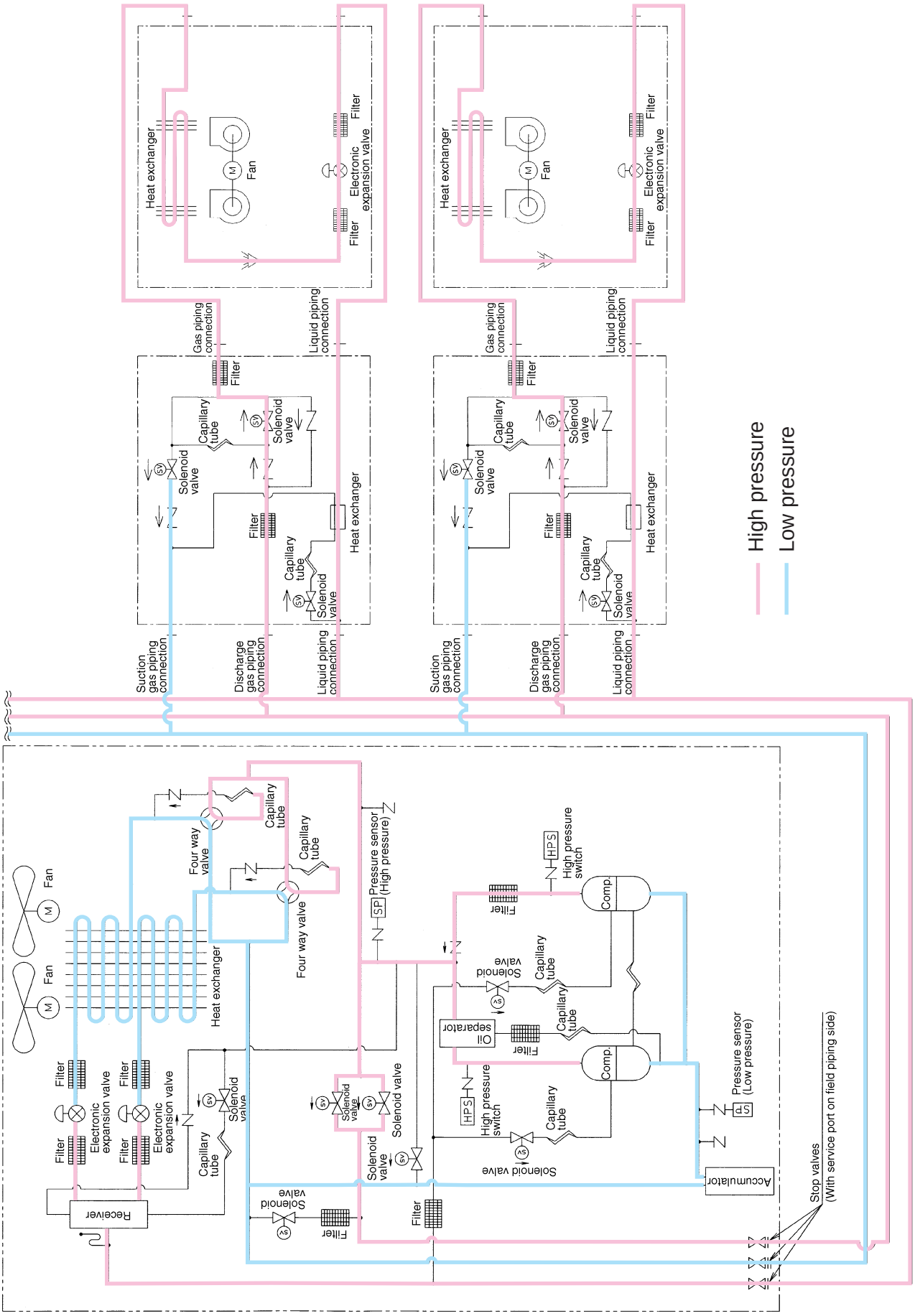
Item	Symbol	Name			Type			
					CU-8ME1XPA		CU-10ME1XPA	
Comp-ressor		Inverter side Model Output	3ϕ, 380~415V	INV	JT100BAVTYE	3.5 kW	JT100BAVTYE	3.5 kW
				STD	JT100BATYE	2.2 kW	JT160BATYE	3.75kW
		Compressor safety thermostat			Discharge pipe thermistor 135°C OFF			
	J1HC/ J2HC	Crank case heater			33W+33W			
	F2C	Over-current relay	3ϕ, 380~415V		HOE-20F-TRA1 10A		HOE-20F-TRA1 13A	
Safety device	Q1M Q2M	Fan motor			140W+230W			
		Safety thermostat			140W: Open 120 ± 5°C, 230W: 135 ± 5°C			
	S1PH	Pressure switch (for high pressure safety)			20SP-688-6 OFF: 27.5+0~–1.0kg/cm^2 ON: 20.0+1.0~–1.0kg/cm²			
	S2PH	Pressure switch (for high pressure safety)			20SP-688-6 OFF: 27.5+0~–1.0kg/cm^2 ON: 20.0+1.0~–1.0kg/cm²			
		Fusible plug			FPG-3D 70~75°C			
Sensor	SENPH	Pressure sensor			PS8030A 0~30kg/cm² (0~2.94MPa)			
	SENPL	Pressure sensor			PS8030A 0~10kg/cm² (0~0.98MPa)			
	R1T	Thermistor (for outdoor air)			3.5~360KΩ			
	R2-1T R2-2T	Thermistor (for heat exchange)			3.5~360KΩ			
	R3-1T	Thermistor (for inverter discharge pipe)			3.5~400KΩ			
	R3-2T	Thermistor (for standard discharge pipe)			3.5~400KΩ			
	R4-1T R4-2T	Thermistor (for suction pipe)			3.5~360KΩ			
	R5T	Thermistor for inverter oil temperature)			3.5~360KΩ			
Other functions /parts	Y1E	Electronic expansion valve		When cooling	ON: 2,000 pulses (Fully open); OFF: 0 pulses (Fully closed)			
				When heating	ON: PI control; OFF: 0 pulses (Fully closed)			
	Y1S	Solenoid valve (pressure equalizing)			BPV1706			
	Y2S	Solenoid valve (for hot gas bypass)			NEV603			
	Y3S	Solenoid valve (for inverter injection)			NEV202			
	Y4S	Solenoid valve (for standard injection)			NEV202			
	Y5S Y7S	Solenoid valve (for discharge gas)			NEV603			
	Y6S	Solenoid valve (for liquid pressure)			NEV603			

1.3 Flow of Refrigerant in Each Operation Mode (ME1 Series)

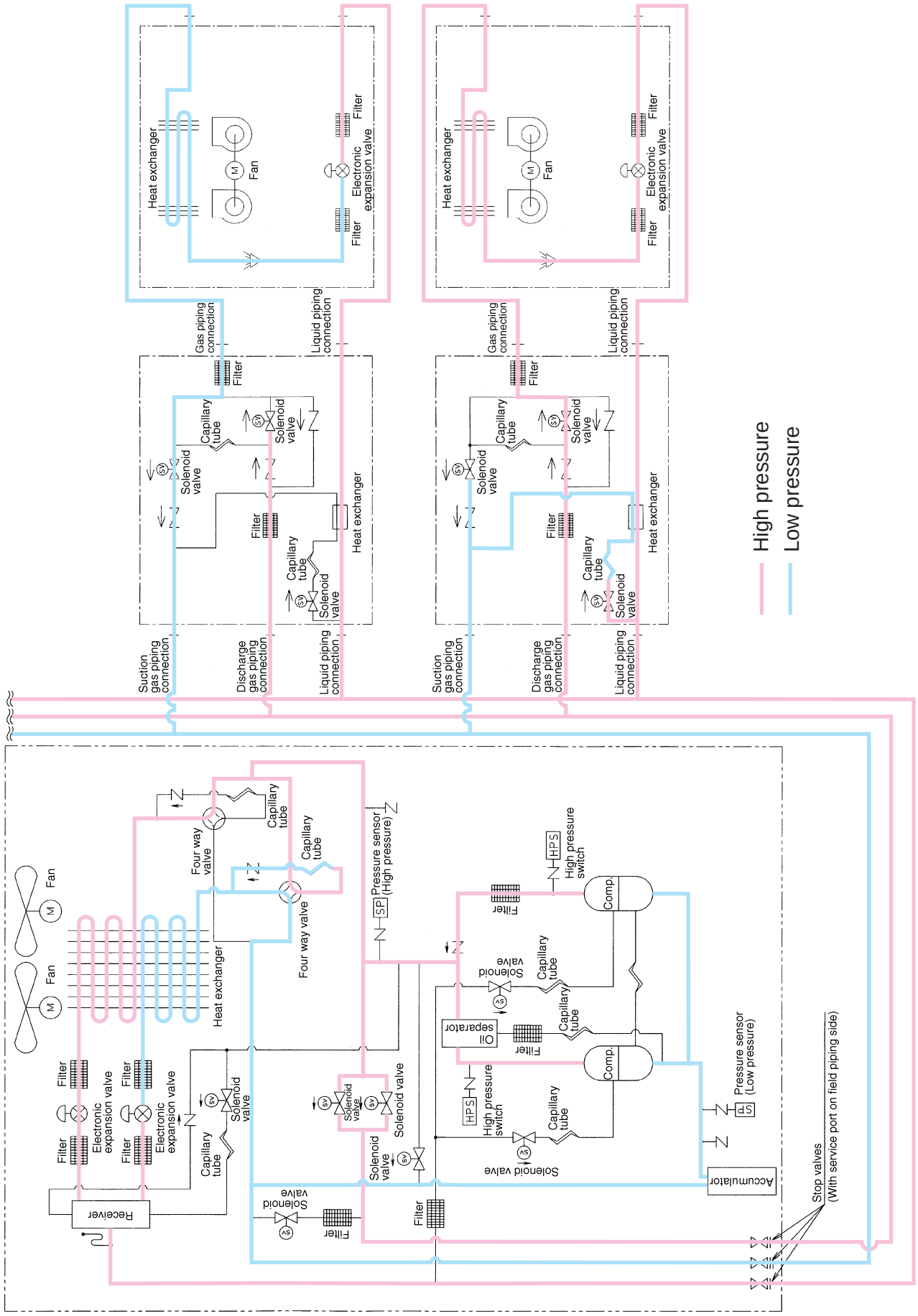
1.3.1 Cooling



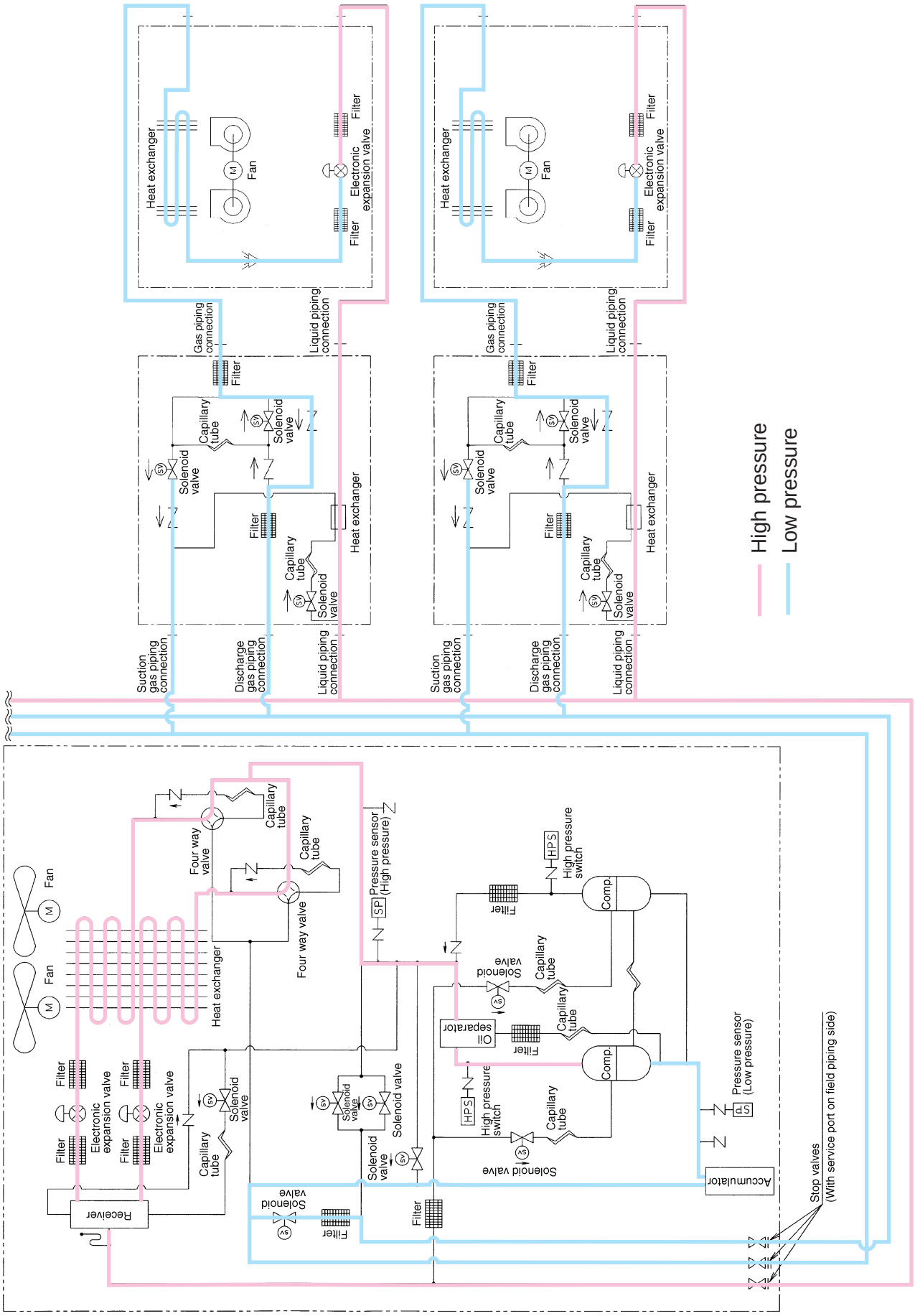
1.3.2 Heating


Heat exchanger
Fan
Filter
Electronic expansion valve
Gas piping connection
Liquid piping connection
Capillary tube
Solenoid valve
Heat exchanger
Suction gas piping connection
Discharge gas piping connection
High pressure
Low pressure
Four way valve
Pressure sensor (High pressure)
High pressure switch
Comp.
Oil separator
Accumulator
Pressure sensor (Low pressure)
Receiver
Stop valves
(With service port on field piping side)

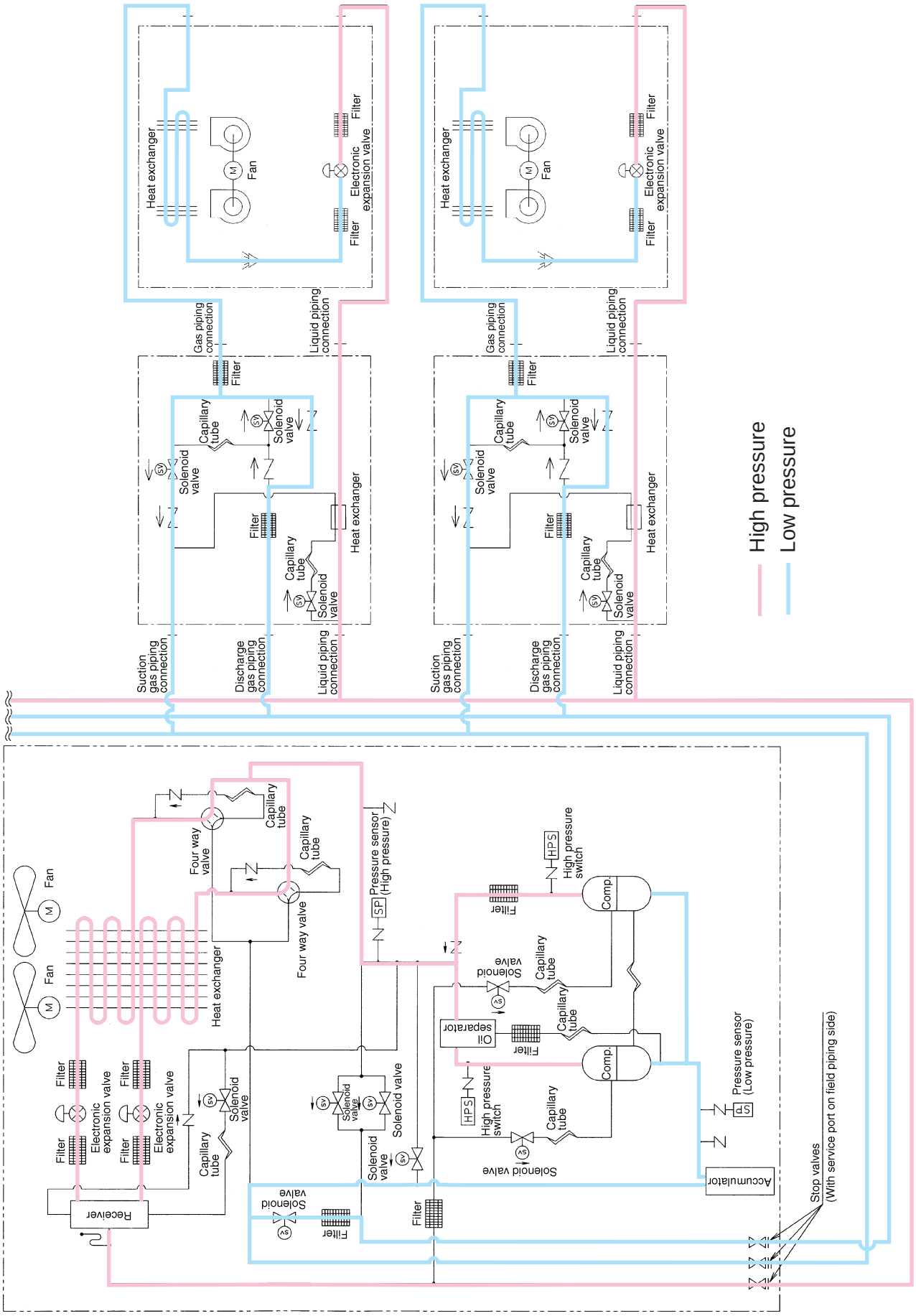
1.3.3 Simultaneous Cooling and Heating



1.3.4 Discharge Oil Return, Defrost



1.3.5 Suction Oil, Defrost



1.4 Outline of Control (ME1 Series)

1.4.1 Inverter Compressor, Motorized PI Control

1. Compressor PI control

- Cooling operation
  Controls TeS (target Te value) at constant ··· Constant-level control of Te (low pressure equivalent saturation temperature)
  TeS = 5.5°C
- Heating operation
  Controls TcS (target Tc value) at constant ··· Constant-level control of Tc (high pressure equivalent saturation temperature)
  TcS = 48°C
- Simultaneous cooling/heating operations
  Controls TeS and TcS at constant
  TeS = 5.5°C
  TcS = 48°C

∗ TeS setting values

L	M (Factory setting)	H
2.5	5.5	8.5

* TcS setting values

L	M (Factory setting)	H
43	46	49

2. Motorized valve PI control

Provides PI control for the motorized valves (Y1E and Y2E) to maintain a constant superheat (SH) level at the outlet of the outdoor heat exchanger (evaporator).
SHs = Ts - Te
SHs = 5°C
∗ Ts1 :Suction pipe temperature (R4-1T)
Ts2: Suction pipe temperature (R4-2T)

3. Heat exchanger PI control

Provides PI control for the motorized valve (Y1E) to maintain TeS and TcS at constant.

Motorized valve mode

EV mode		Initial opening	Max. opening	Min. opening	Normal opening
1	Y1E	2000	2000	2000	Fixed at 2000
	Y2E	2000	2000	2000	Fixed at 2000
2	Y1E	2000	2000	1400	Heat exchanger PI control
	Y2E	0	0	0	Fixed at 0
3	Y1E	750	1400	100	Heat exchanger PI control
	Y2E	250	400	100	Motorized valve PI control
4	Y1E	0	0	0	Fixed at 0
	Y2E	700	1000	100	Motorized valve PI control
5	Y1E	700	2000	100	Motorized valve PI control
	Y2E	500	2000	100	Motorized valve PI control

Heat exchanger mode

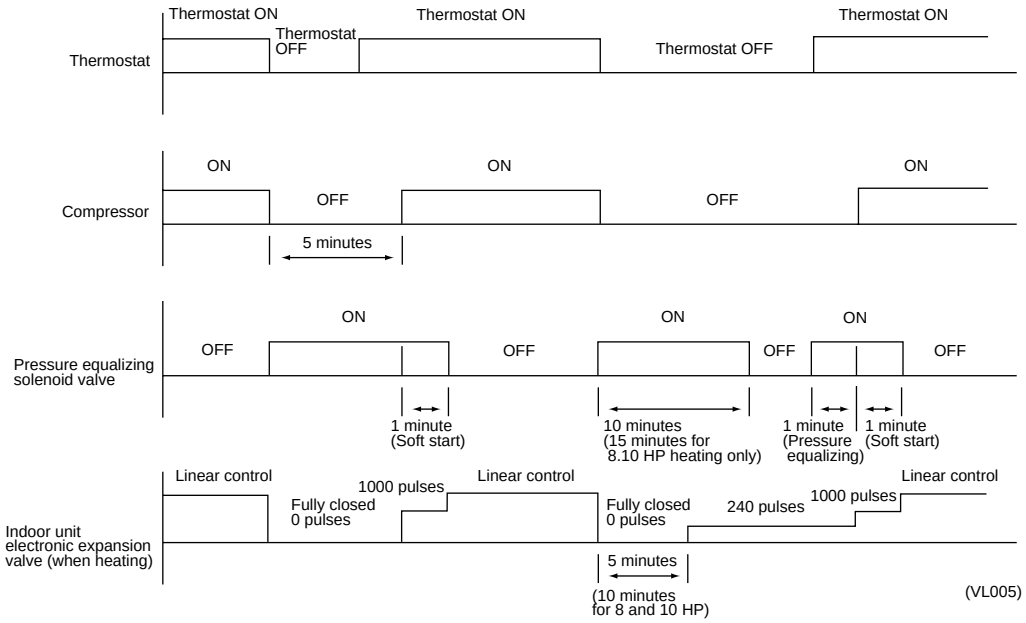
	Heat exchanger 1	Heat exchanger 2	FAN	EV mode
Cooling operation ↑	COND	COND	H + ON	1
	COND	COND	L + ON	1
	COND	COND	H + OFF	1
	COND	COND	L + OFF	1
	COND	EVAP	H + ON	2
	COND	EVAP	L + ON	2
	COND	EVAP	H + OFF	2
	COND	EVAP	L + OFF	2
	COND	EVAP	L + OFF	3
	COND	EVAP	L + OFF	4
	COND	EVAP	H + OFF	4
	COND	EVAP	H + ON	4
	EVAP	EVAP	L + OFF	4
	EVAP	EVAP	H + OFF	4
	EVAP	EVAP	H + ON	4
↓ Heat operation	EVAP	EVAP	H + ON	5

COND: Condenser
EVAP: Evaporator

1.5 Safety for Restart

1.5.1 Restart Safety Timer

The compressor will not run for five minutes by making forced thermostat OFF condition in order to prevent it from being turned on and off in rapid succession, and to equalize pressure in the refrigerant circuit. It however restarts automatically after five minutes passes if it is in thermostat ON condition. The pressure equalizing solenoid valve is actuated for 10 minutes (15 minutes for 8 and 10HP heating only) after the compressor stops in order to equalize pressure.



If 10 minutes or more has elapsed since the compressor was turned off (15 minutes for 8 and 10HP heating only) , turn the solenoid valve for equalizing pressure on for about 1 minute and equalize the pressure.

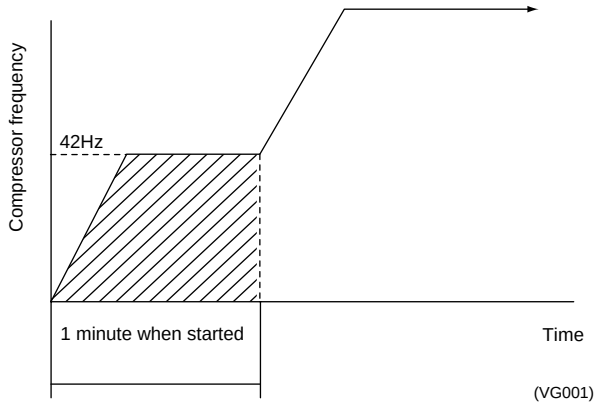
When heating, to prevent noise produced by the passing of indoor unit's refrigerant to equalize pressure after the compressor stops, fully close the indoor unit's electronic expansion valve for 5 minutes (10 minutes for 8 and 10HP).

1.5.2 Soft Start

The following control is carried out to protect the compressor and inverter.

1. Operates at low frequency (fixed) for 1 minute after compressor starts. (Prevents liquid refrigerant backflow)
2. Pressure equalizing and hot gas bypass solenoid valves open and start low load.

Soft Start of Compressor



	Frequency during soft start
CU-5	42Hz
CU-8·10	42Hz+OFF

1.5.3 Pump Down Start

If the compressor stops running with refrigerant still remaining in the accumulator, in order to prevent wet operation at the next compressor starting, it will perform pump down start with a completely dry accumulator, then it will operate normally.

Pump down start should be performed if the unit is in any of the conditions given below when pressure equalizing control has been completed before start.
If R3T (R3-1T) is less than 95°C and the unit is in any of the following conditions.

- ◆ Within 10 minutes of the compressor starting
- ◆ Defrosting or during oil return
- ◆ Within 20 minutes of completion of defrost or oil return
- ◆ Outdoor air temperature is less than -5°C (MX1 Series)
- ◆ Outdoor air temperature (R1T) < 0ºC (ME1 Series)
- ◆ Oil temperature (R5T) < Te + 10ºC (ME1 Series)
  Te : Low pressure equivalent saturated temperature

Operation During Pump Down Start

MX1 Series ← 11 min. 30 sec. →

	1 min.	5 min.	30 sec.	30 sec.	4 min. 30 sec.
Compressor	42Hz (42Hz+OFF)	42Hz (42Hz+OFF)	42Hz (42Hz+OFF) Note 1		30~106 Hz+OFF PI control ∗ Note 2
Outdoor unit EV	0 pulses	0 pulses	0 pulses		SH control (Initial opening 150 pulses)
Outdoor unit fan	H tap (H+ON)	H tap (H+ON)	H tap (H+ON)		H tap (H+ON)
Y2S	ON	ON	ON	OFF	ON/OFF (LP protection control)
Y3S, Y4S	ON	ON/OFF (Td protection control)	ON/OFF (Td protection control)		ON/OFF (Td protection control)

Note

1. Note 1: 30Hz (30Hz+OFF) for products produced after Aug. '99.
2. ∗Note 2 : When heating, low pressure < 1.5 kg/cm² (0.147MPa) → running frequency 54Hz (54Hz + OFF)
   Low pressure > 1.7 kg/cm² (0.167MPa) [30 sec. continuous] → release

- ◆ Y2S: Hot gas bypass solenoid valve
- ◆ Y3S: Injection solenoid valve

ME1 Series ← 11 min. 30 sec. →

	1 min.	5 min.	30 sec.	30 sec.	4 min. 30 sec.
Compressor	42Hz+OFF	42Hz+OFF	30Hz+OFF		116Hz+OFF
Outdoor unit EV	0 pulses	0 pulses	0 pulses		150 pulses
Outdoor unit fan	H tap (H+ON)	H tap (H+ON)	H tap (H+ON)		H tap (H+ON)
Y2S	ON	ON	ON	OFF	ON/OFF (LP protection control)
Y3S	ON	ON/OFF (Td protection control)	ON/OFF (Td protection control)		ON/OFF (Td protection control)

- ◆ Y2S: Hot gas bypass solenoid valve
- ◆ Y3S: Injection solenoid valve

1.5.4 Heating Lay-Up Start

If the compressor hasn't run for a long time and the refrigerant isn't circulated, foaming could cause a lack of oil when the compressor is started at the next time. It should therefore perform heating lay-up start to keep the low pressure from dropping too low in the following cases.

- ◆ When, after being power ON, the accumulated running time of the compressor does not exceed one hour.
- ◆ When the compressor has been stopped for more than 24 hours.

Operation During Heating Lay-Up Start

Make the compressor's upper limit frequency 60Hz (60Hz+OFF) for 10 minutes 20 seconds after the compressor starts.

∗ If the low pressure becomes < 1.5kg/cm² (0.147MPa) within 10 minutes after starting, Y2S is actuated and outdoor unit EV becomes 0 pulses. 10 minutes after start, the unit starts up as described below. (8,10 Hp)

	4 min. 30 sec.
Compressor	PI control (upper limit 116Hz [116Hz+OFF]) ∗
Outdoor unit EV	SH control (initial opening 150 pulses)
Outdoor unit fan	H tap (H+ON)
Y2S	ON/OFF (LP safety control)
Y3S	ON/OFF (Td safety control)

- ◆ Y2S: Hot gas bypass solenoid valve
- ◆ Y3S: Injection solenoid valve

∗ If low pressure becomes < 1.5 kg/cm² (0.147MPa), operating frequency becomes 54Hz.
If low pressure becomes > 1.7 kg/cm² (0.167MPa), the heating lay-up operation is released.

1.6 Equalized Oil Level Operation
(Equalized Oil Level between Twin Compressors)

If using two compressors (8, 10Hp) connected in parallel, oil level equalizing is carried out for 5 minutes when the cumulative running time of the standard compressor exceeds 2 hours in order to prevent lack of oil caused by difference in pressure inside the dome due to drift, and then reverts to normal operation.

Inverter compressor	Standard compressor
106Hz	OFF

∗ If oil pressure equalization is not achieved during 5 minutes by stopping or step-down control, oil pressure equalization is carried out when the compressor starts running.

With an inverter compressor operation, however, if the standard compressor remains off for 10 minutes, the cumulative running time of the standard compressor is reset.

1.7 Oil Return Operation

1.7.1 MX1 Series

In order to collect refrigeration oil held up in connecting piping, the compressor's operating time is counted, and oil return operation is carried out for 4 minutes every 8 hours (2 hour after turning on the power supply, and every 8 hours after that).
(When heating, the indoor unit's electric heater is tuned off one minute prior to oil return operation in preparation for oil return.)

1. Compressor Operation Frequency

Type	Cool	Heat
CU-5 (5HP)	106Hz	96Hz
CU-8 (8HP)	106Hz+ON	86Hz+ON
CU-10 (10HP)	106Hz+ON	86Hz+ON

- ◆ When heating, frequency is lower than that given in the table for the first 30 seconds and 30 seconds after completion.
- ◆ Frequency may drop according to the various types of step-down control. If so, the next oil return must be carried out 4 hours later.

2. Opening of the Electronic Expansion Valve

	Outdoor unit	Operating indoor unit	Indoor unit turned off
When cooling	2000 pulses (fully open)	2000 pulses (fully open)	1440 pulses
When heating	2000 pulses (fully open)	2000 pulses (fully open)	2000 pulses (fully open)

3. 4-way Changeover Valve (Y1R)

When cooling: No change
When heating: Switches to cooling mode

4. Fan and Solenoid Valve

Step No. changes according to high pressure.

Step No.	Y2S	Y3S, Y4S	Fan
1	ON*	ON	H(H+ON)
2	OFF**	ON	L(H+OFF)
3	OFF**	ON	OFF

(Step No. becomes higher as high pressure decreases.)
Step 1 → Step 2 30 sec. after oil return start or high pressure < 16kg/cm² (1.57MPa)
Step 2 → Step 3 High pressure < 7.5 kg/cm² (0.74MPa)
Step 3 → Step 2 High pressure > 15 kg/cm² (1.47MPa)
Step 2 → Step 1 High pressure > 20 kg/cm² (1.96MPa)

* When heating only
** On when low pressure < 0.3 kg/cm² (0.029MPa)
Off when low pressure > 0.8 kg/cm² (0.078MPa)

Notes:
1. If the compressor frequency continues at 68Hz (38Hz+ON for 8, 10HP) or more for more than eight minutes with defrosting while the oil return timer is counting, the timer is reset and counts again for eight hours.
2. If on standby (forced thermostat OFF) or the compressor stops due to malfunction during oil return operation, the next time the compressor starts, oil return operation is again carried out for four minutes after completion of soft start.
3. Oil return operation is not carried out for 28 minutes after defrosting is completed.

1.7.2 ME1 Series

In order to collect refrigeration oil held up in connecting piping, the compressor's operating time is counted, and oil return operation is carried out for 8 minutes 30 seconds every 8 hours (2 hour after turning on the power supply, and every 8 hours after that).
(When heating, the indoor unit's electric heater is tuned off one minute prior to oil return operation in preparation for oil return.)

Operation Contents

Preparation for Oil Return

1 Minute Elapses

Upper Limit Frequency Limited to 38Hz + ON

(VF014)

Step 1 → Discharge oil return k = kg/cm²

Compressor	86Hz + OFF
EEV	2000pls
Outdoor Unit Fan	H + ON
Outdoor Unit Heat Exchanger	Condenser
4 Way Valve	OFF
Injection 1	Td Protection Control
Injection 2	OFF
Hot Gas	ON at Lp < 0.3k

↓ 4 Minutes Elapsed

Step 2 → Suction oil return

Compressor	86Hz + OFF
EEV	2000pls
Outdoor Unit Fan	H + ON
Outdoor Unit Heat Exchanger	Condenser
4 Way Valve	OFF
Injection 1	Td Protection Control
Injection 2	Td Protection Control
Hot Gas	ON at Lp < 0.3k

↓ 4 Minutes Elapsed
∗ Td : Discharge Pipe Temperature

Step 3 → HR solenoid valve changeover

Compressor	38Hz + OFF
EEV	2000pls
Outdoor Unit Fan	H + ON
Outdoor Unit Heat Exchanger	Condenser
4 Way Valve	OFF
Injection 1	Td Protection Control
Injection 2	OFF
Hot Gas	ON at Lp < 0.3k

↓ 30 Seconds Elapsed

Step 4 → Refrigerant is discharged from accumulator

Compressor	76Hz + OFF
EEV	Limit of Opening
Outdoor Unit Fan	H + ON
Outdoor Unit Heat Exchanger	Evaporater
4 Way Valve	ON
Injection 1	Td Protection Control
Injection 2	OFF
Hot Gas	Low Pressure Protection Control

↓ 5 Minutes Elapsed
Hp > 14k
R5T > Te + 10ºC
* Te : Low Pressure Equivalent Saturated Temperature

Normal Control

1.8 Defrost

1.8.1 MX1 Series

■ Function

Defrost operation is carried out if the relation of the outdoor unit's coil temperature (Tcoil) and outdoor temperature (Tair) satisfies the conditions given below for 5 minutes continuously.

$Tcoil \leq C \cdot Tair - \alpha$

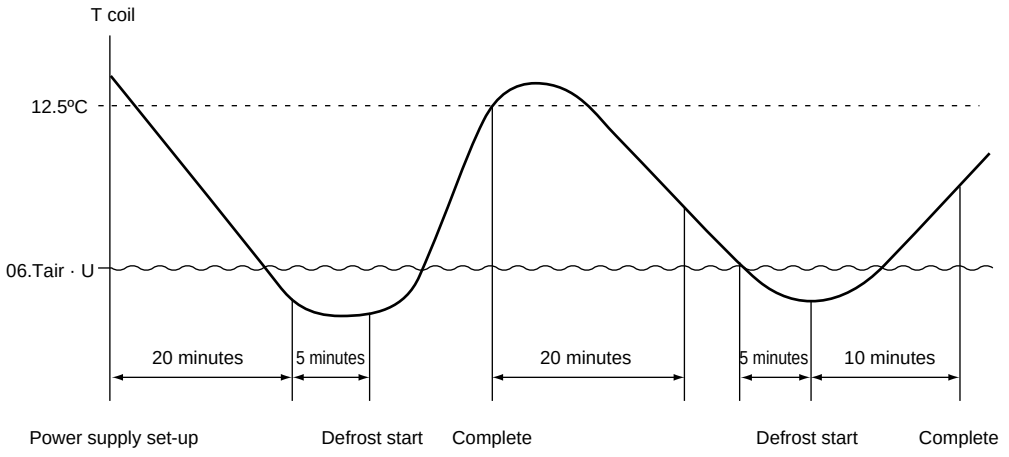
- Tcoil : Temperature detected by R2T
- Tair : Temperature detected by R1T
- C : Tair < 0°C → 0.8
  Tair ≥ 0°C → 0.6

The values of (α) according to defrost temperature changeover switch are given in the table below.

Switch position LED (23 24 25 26)	L (● ● ● ○)	M (● ● ○ ●)	H (● ○ ● ●)
(deg)	12	10	8

Therefore, if outdoor temperature is 0°C:
(1) If position L, Tcoil ≤ -12°C
(2) If position M, Tcoil ≤ -10°C
(3) If position H, Tcoil ≤ -8°C
Because defrost operation is carried out, set to the "H" position if frost builds up easily, and set to "L" if not. Factory set is position "M."

Defrost is carried out when the coil temperature rises to 12.5ºC or higher, and is completed after defrosting for 10 minutes. After defrosting, indoor units carry out hot start operation and the DEFROSTING display lights until hot start is complete.
Defrost conditions are not counted from completion of power supply set-up and defrost until the compressor runs (count) for 20 minutes.



1.8.2 ME1 Series

Melts frost which might collect on outdoor heat exchangers during heating in order to recover their heat transfer performance.

Conditions for executing defrost

OR	**&**	At least 20 minutes have elapsed since completion of oil return or since compressor starts.
		High pressure < 20k (Tc = 52.4ºC)
		Compressor is running at least 30 minutes since completion of previous defrost.
		Either liquid pipe thermal detection temperature (R2-1T, R2-2T) < TºC for 5 minutes.
	&	Forced defrost test pin (MDS) is shorted.
		Liquid pipe thermal detection temperature (R2-1T, R2-2T) < 12.5ºC for all units
		High pressure < 20k (Tc = 52.4ºC)

∗ Tc : High pressure equivalent saturated temperature

T = C × (Outdoor temp.) – α
(C is constant)
C : Tair ≤ 0°C → 0.8
Tair > 0°C → 0.6
∗ Tair = Outdoor air temperature

The values of (α) according to defrost temperature changeover switch are given in the table below.

Switch position LED (H4P, H5P, H6P, H7P)	L (● ● ● ○)	M (● ● ○ ●)	H (● ○ ● ●)
(deg)	12	10	8

Therefore, if outdoor temperature is 0°C:
(1) If position L, Tcoil (R2-1T, R2-2T) ≤ -12°C
(2) If position M, Tcoil (R2-1T, R2-2T) ≤ -10°C
(3) If position H, Tcoil (R2-1T, R2-2T) ≤ -8°C
Because defrost operation is carried out, set to the “H” position if frost builds up easily, and set to “L” if not. Factory set is position “M.”

Operation Contents

Preparation for Defrost → 1 Minute Elapses

Upper Limit Frequency Limited to 38Hz + ON (VF015)

Step 1 → Discharge defrost k = kg/cm²

Compressor	86Hz + OFF
EEV	2000pls
Outdoor Unit Fan	OFF + OFF
Outdoor Unit Heat Exchanger	Condenser
4 Way Valve	OFF
Injection 1	Td Protection Control
Injection 2	OFF
Hot Gas	ON

↓ 3 Minutes Elapsed

Step 2 → Suction defrost

Compressor	86Hz + ON
EEV	2000pls
Outdoor Unit Fan	OFF + OFF
Outdoor Unit Heat Exchanger	Condenser
4 Way Valve	OFF
Injection 1	Td Protection Control
Injection 2	Td Protection Control
Hot Gas	ON

↓ Conclusion of Defrost Completion Condition

or
- All of R2-1T, R2-2T ≥ 12.5ºC
- Pc > 20.5k
- 10 Minutes Elapsed Since Defrost Operation Start

Step 3 → HR solenoid valve changeover

Compressor	38Hz + OFF
EEV	2000pls
Outdoor Unit Fan	OFF + OFF
Outdoor Unit Heat Exchanger	Condenser
4 Way Valve	OFF
Injection 1	Td Protection Control
Injection 2	OFF
Hot Gas	ON

↓ 40 Seconds Elapsed

Step 4 → Refrigerant is discharged from accumulator

Compressor	76Hz + OFF
EEV	Limit of EV Opening
Outdoor Unit Fan	H + ON
Outdoor Unit Heat Exchanger	Evaporator
4 Way Valve	ON
Injection 1	Td Protection Control
Injection 2	OFF
Hot Gas	Low Pressure Protection Control

↓

or
- 5 Minutes Elapsed
- Pc > 14k
- R5T > Te + 10ºC

Normal Control

∗Pc = Condensing Pressure

1.9 Pressure Equalization Control (ME1 Series)

The discharge gas and suction gas pipes are bypassed to eliminate differential pressure between the inlet and outlet of the solenoid valve during HR box(e)s solenoid switching operations.

■ Equalizing operation demand → Pressure equalization solenoid valve (Y1S) is ON at following conditions.

&	Operating condition of indoor unit with thermostat ON is different from the condition of HR boxes' solenoid valve (see page 38).
	Not in startup control.
	Liquid refrigerant not being discharged from accumulator.
	Not in residual pump-down operation.
	7 minutes passed after completion of previous pressure equalizing control operation.
	Not in oil return control
	Not in defrost operation

1.10 Frequency Limit Control by Pressure Equalization (ME1 Series)

The compressor operating capacity is limited to prevent abnormal noise caused by the equalizing operation.

Operating conditions

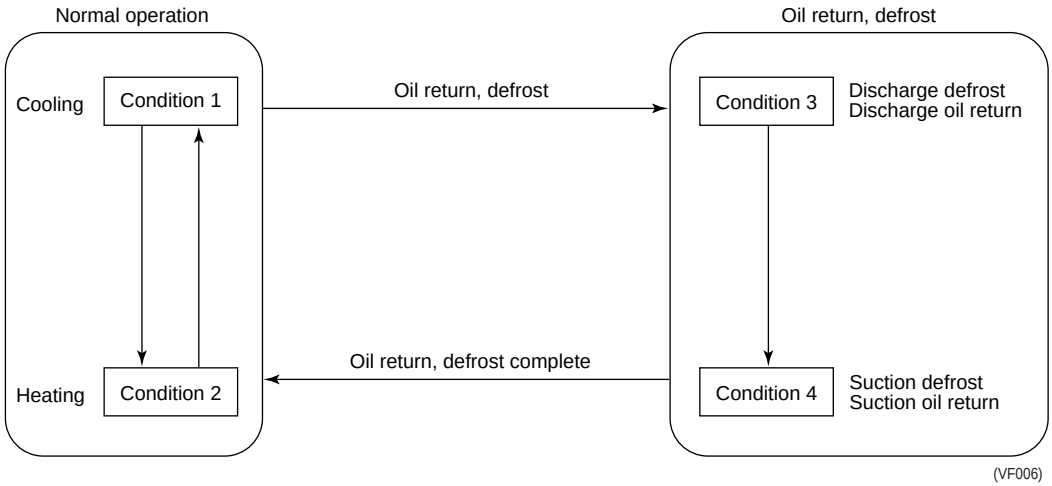
&	Equalizing operation demand issued
	Not in cooling operation only

During the first 30 seconds, the following operations are conducted.

	INV outdoor unit
Compressor operating capacity	54Hz + OFF

1.11 HR Changeover Control (ME1 Series)

The solenoid valve of the HR box is switched according to the indoor unit operating condition.



Condition	Indoor unit operating condition	Y3S	Y2S	Y1S
1	Cooling Heating stop ∗1	OFF	ON	OFF
2	Heating thermostat OFF Heating thermostat ON	ON	OFF	∗2
3	Discharge oil return	OFF	OFF	OFF
4	Suction oil return Defrost	ON	ON	OFF

ON: Open
OFF: Closed

When the solenoid is operable, if the operating condition differs from the solenoid condition, the solenoid is switched according to the above table.
However, the following conditions take precedence.

∗1: Condition 2 results in heating stop units when no unit in the system is in cooling operation.
∗2: Condition 1 results when a unit connected to the HR box is in heating thermostat ON condition during simultaneous cooling/heating operations.

1.12 Pump Down Residual Operation

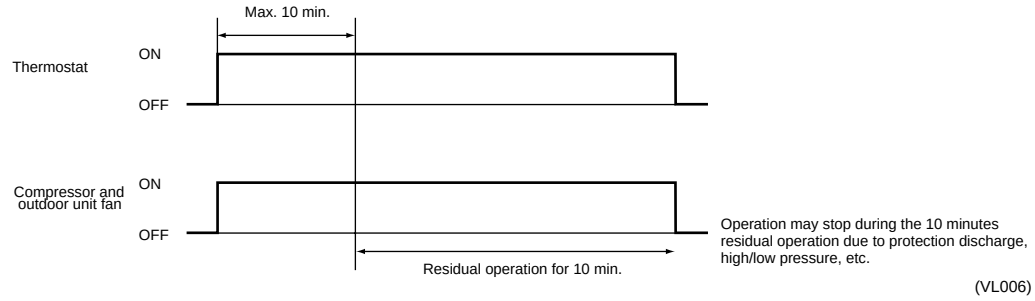
1.12.1 MX1 Series

If refrigerant is remaining in the accumulator when the compressor starts, liquid refrigerant is sucked into the compressor, diluting the refrigerant machine oil and reducing the lubricating performance. To prevent this, the pump-down operation discharges refrigerant from the low pressure side when the unit is not in operation.

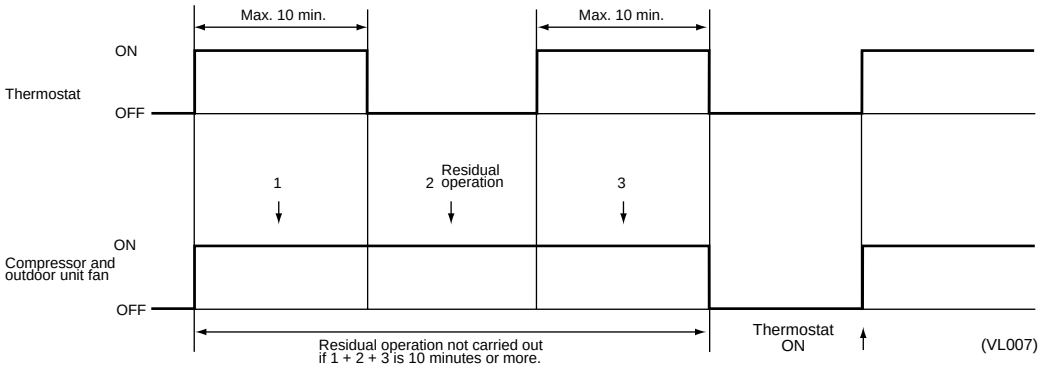
Residual operation may be carried out for 10 minutes under the following conditions when heating.

1. When outdoor temperature (R1T) is ≥ -5°C and inverter discharge pipe temperature (R3-1T) < 95ºC, and a OFF by thermostat command is received with the compressor's continuous operation time being 10 minutes or less, residual operation is carried out for a maximum of 10 minutes.

&	Discharge pipe thermistor (R3-1T) on inverter side: 95°C or lower	
	OR	Outside air temperature thermistor (R1T) < 0°C
		When compressor continuous operating time is less than 10 minutes and thermostat is OFF, or when stop command is received from remote controller
		Within 20 minutes after defrost or oil return operation
		T0 (oil temperature) ≤ Te+10



2. When the thermostat is ON during residual operation, residual operation is not carried out if the total of 1+2+3 is 10 minutes or more.



3. When outdoor temperature (R1T) < -5°C and a stop command is received from the thermostat sensor, etc., residual operation is carried out for 10 minutes without fail. (Operation may however stop for discharge pipe or high/low pressure safety.)

Outdoor Unit Function

Outdoor air (R1T)	Compressor		Electronic expansion valve	Pressure equalizing solenoid valve	Time
	INV	STD			
R1T < -10°C	86Hz	OFF	0~300 pulses	ON or OFF	10 min.
-10°C ≤ R1T < 0°C	76Hz	OFF	0~300 pulses	ON or OFF	10 min.
R1T ≥ 0°C	60Hz	OFF	0~300 pulses	ON or OFF	10 min.

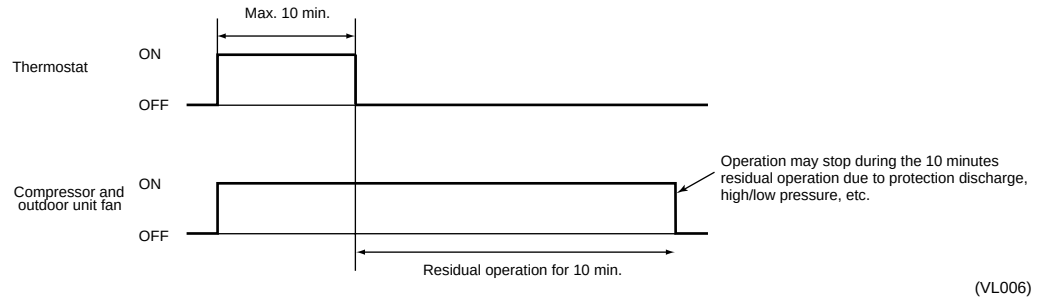
Notes
- During defrost or oil return, residual operation is not carried out even if a stop command comes.
- Forced thermostat OFF occurs if defrost or oil return signal comes during residual operation.

1.12.2 ME1 Series

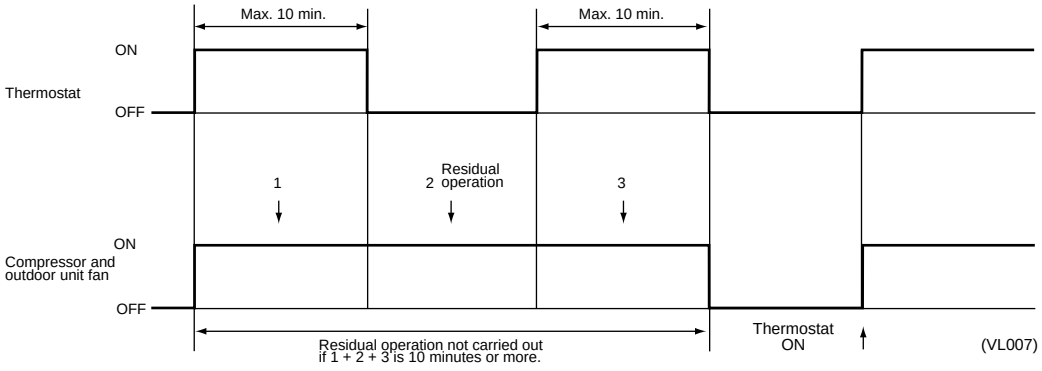
If refrigerant is remaining in the accumulator when the compressor starts, liquid refrigerant is sucked into the compressor, diluting the refrigerant machine oil and reducing the lubricating performance. To prevent this, the pump-down operation discharges refrigerant from the low pressure side when the unit is not in operation.

Residual operation may be carried out for Max.10 minutes under the following conditions.
1.

&	Secondary side heat exchanger 4 way valve (Y2R) is ON.	
	Discharge pipe thermistor (R3-1T) on inverter side: 95°C or lower	
	OR	Outside air temperature thermistor (R1T) < 0°C
		When compressor continuous operating time is less than 10 minutes and thermostat is OFF, or when stop command is received from remote controller
		Within 20 minutes after defrost or oil return operation
		R5T (oil temperature) ≤ Te+15



2. When the thermostat is ON during residual operation, residual operation is not carried out if the total of 1+2+3 is 10 minutes or more.



Outdoor Unit Function

Outdoor air (R1T)	Compressor		Electronic expansion valve	Time
	INV	STD		
R1T < -10°C	86Hz	OFF	0~300 pulses	10 min.
-10°C ≤ R1T < 0°C	76Hz	OFF	0~300 pulses	10 min.
R1T ≥ 0°C	60Hz	OFF	0~300 pulses	10 min.

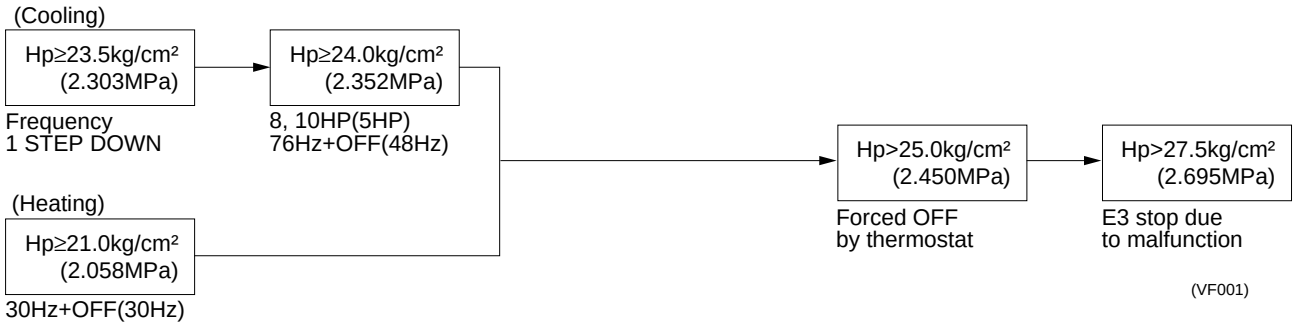
Notes

- During defrost or oil return, residual operation is not carried out even if a stop command comes.
- Forced thermostat OFF occurs if defrost or oil return signal comes during residual operation.

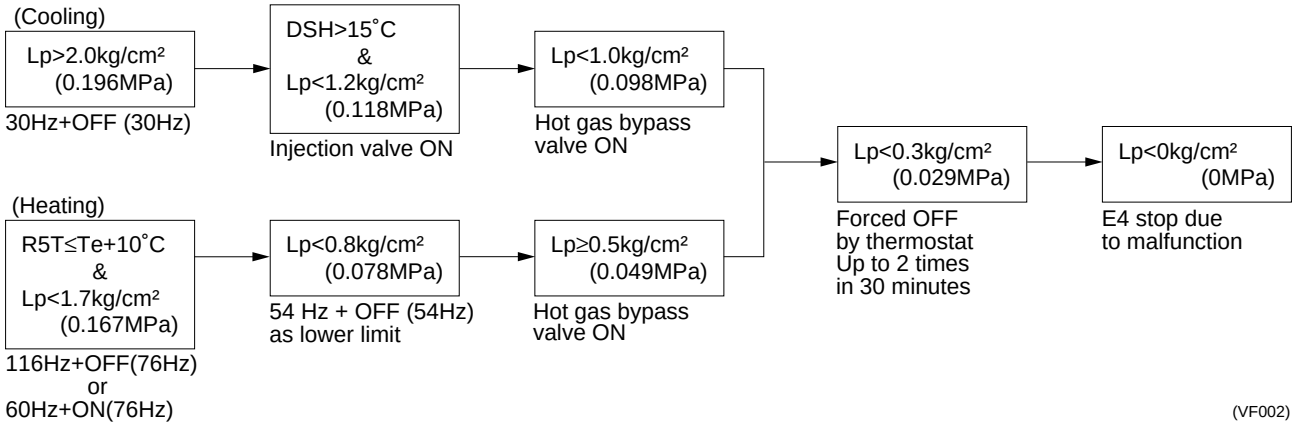
1.13 Step Down / Safety Control → Standby (Forced Thermostat OFF) → Stop Due to Malfunction

1.13.1 MX1 Series

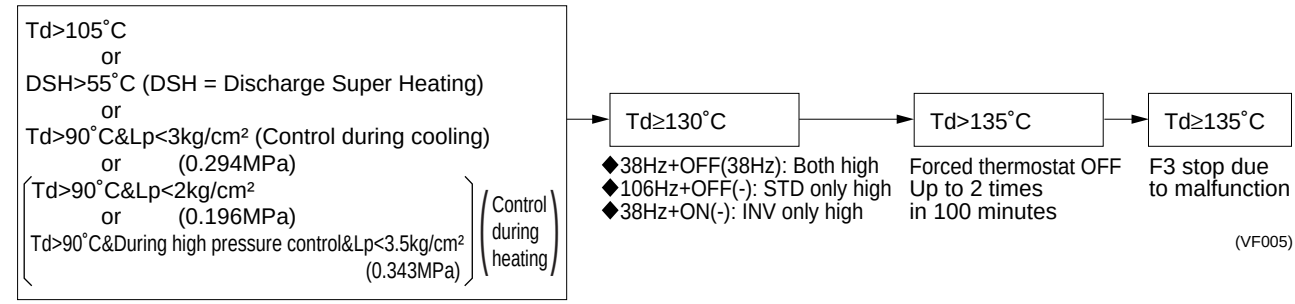
High Pressure (Hp) Control



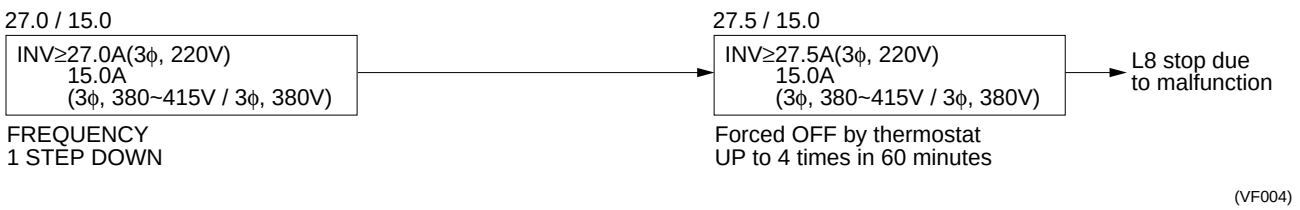
Low Pressure (Lp) Control



Discharge Pipe Temperature (Td) Control



Inverter Current Control


27.0 / 15.0
INV≥27.0A(3ϕ, 220V) 15.0A (3ϕ, 380~415V / 3ϕ, 380V)
FREQUENCY 1 STEP DOWN
27.5 / 15.0
INV≥27.5A(3ϕ, 220V) 15.0A (3ϕ, 380~415V / 3ϕ, 380V)
Forced OFF by thermostat UP to 4 times in 60 minutes
L8 stop due to malfunction
(VF004)

Discharge Super Heating (DSH) Control

(DSH = Td - high pressure condensation saturation temperature)
During both the inverter and standard compressors are running, when the injection valve for either one goes OFF and discharge super heating (DSH) continues for 10 minutes at temperature difference of less than 10°C, the inverter+standard compressor are controlled at 76 Hz or less+OFF for 3 minutes.

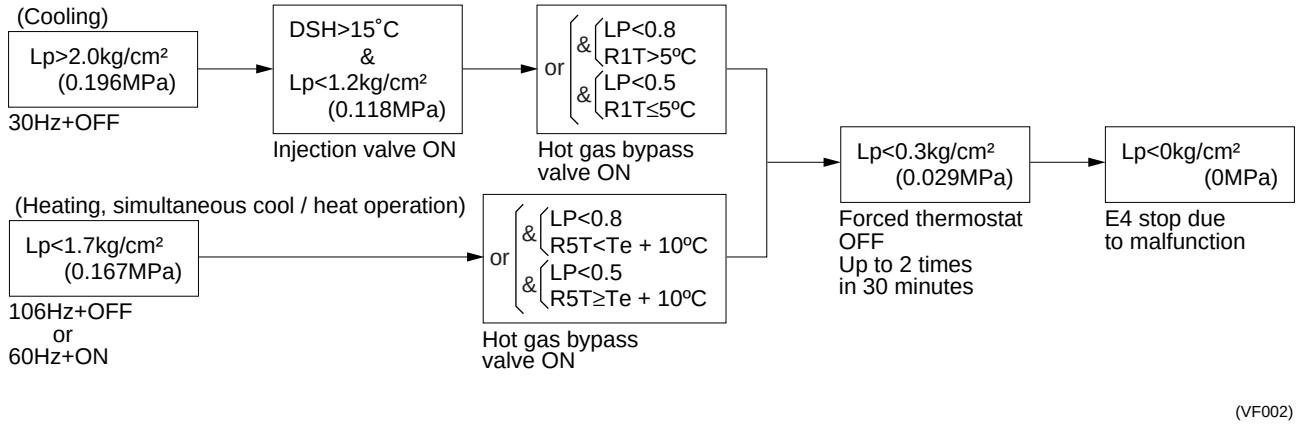
Control According to Outdoor Temperature

If the outdoor temperature exceeds 27°C when heating, forced thermostat OFF is carried out in order to prevent a safety device from being tripped or a sensor malfunction.

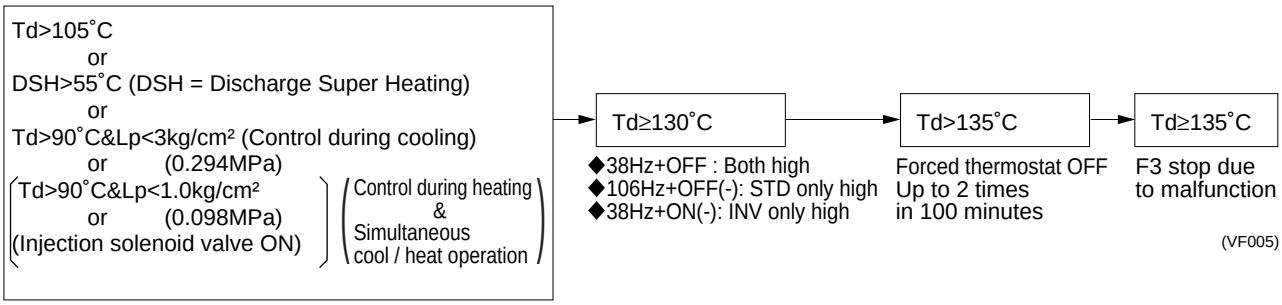
1.13.2 ME1 Series

High Pressure (Hp) Control

Low Pressure (Lp) Control



Discharge Pipe Temperature (Td) Control



Inverter Current Control

Discharge Super Heating (DSH) Control

(DSH = Td - high pressure condensation saturation temperature)
During both the inverter and standard compressors are running, when the injection valve for either one goes OFF and discharge super heating (DSH) continues for 10 minutes at temperature difference of less than 10°C, the inverter+standard compressor are controlled at 76 Hz or less+OFF for 3 minutes.

Control According to Outdoor Temperature

If the outdoor temperature exceeds 23°C when heating, forced thermostat OFF is carried out in order to prevent a safety device from being tripped or a sensor malfunction.

1.14 Control During Low Outdoor Air Temperature Cooling

When the outdoor air temperature is low in cooling operation, outdoor unit fans, electronic expansion valve and compressors are controlled as follows in order to primarily maintain high pressure and to protect drop in refrigerant circulation caused by drop in high pressure.

CU-5

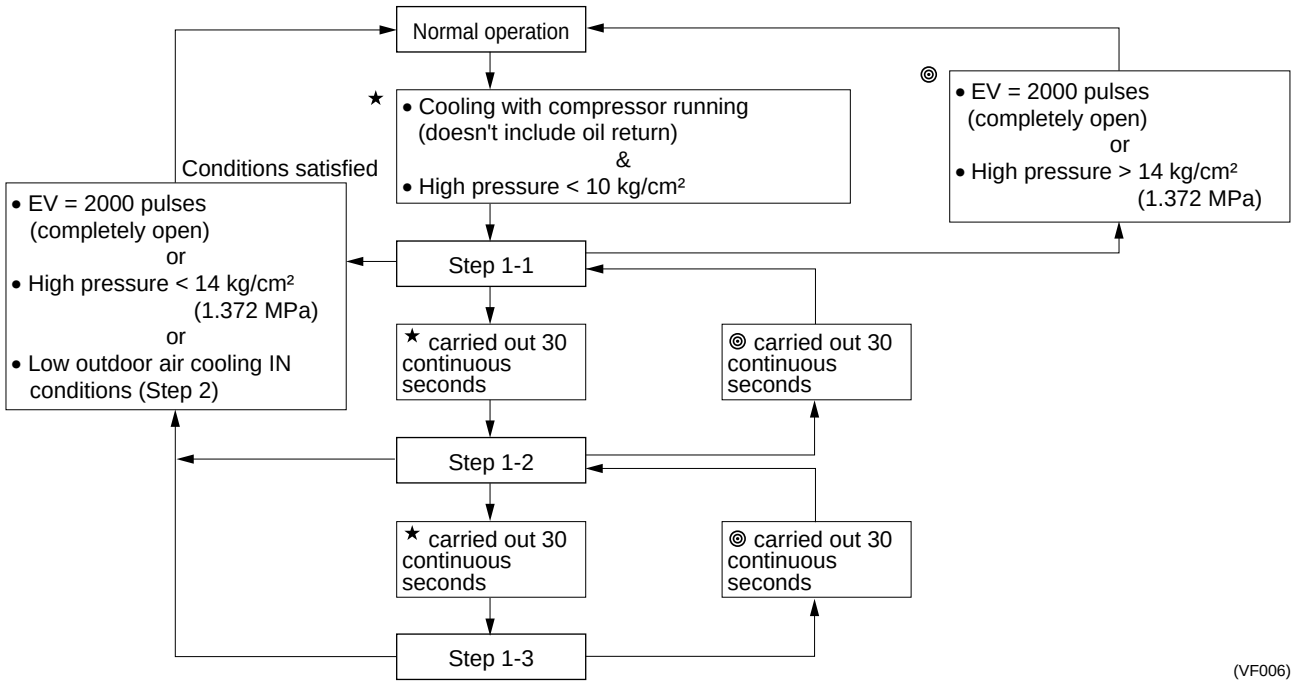
Operating status		Electronic expansion valve	Fan	Frequency (Hz)
Normal operation		Fully open	H	Changes according to operating status
Low outdoor temperature cooling operation	Step 1	Fully open	L	76
	Step 2	Fully open	OFF	48

CU-8·10

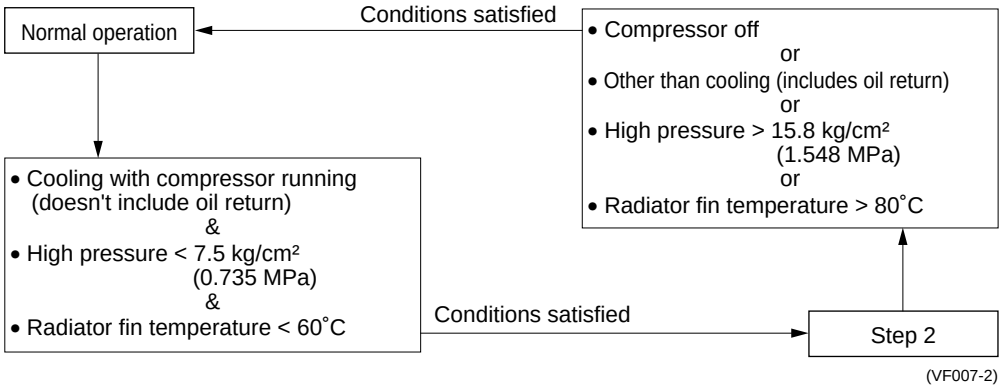
Operating status		Electronic expansion valve	Fan		Frequency (Hz)	
			M1F	M2F	CU-8	CU-10
Normal operation		Fully open	H	ON	Changes according to operating status	
Low outdoor temperature cooling operation	Step 1-1	Fully open	L	ON	96	116
	Step 1-2	Fully open	H	OFF	86	106
	Step 1-3	Fully open	L	OFF	76	96
	Step 2	Fully open	OFF	OFF	60	76

Note: Step No. changes according to high pressure, low pressure and frequency.
(Step No. increases with reduction of high and low pressure.)

Low Outdoor Air Cooling in Conditions (Steps 1-1, 2, 3)



Low Outdoor Air Cooling in Conditions (Step 2)



1.15 Low Noise Control

If the sound produced by outdoor units is a problem at night, etc., you can reduce the running noise by 2 to 3 dB by running the outdoor unit fans and compressors at low speed via contact input (low noise input) from outside. When low noise input is received (contact short circuit) while the compressor is running (except when defrosting or oil return is being carried out), the operation upper limit is as follows.

		CU-5	CU-8	CU-10
		(5HP)	(8HP)	(10HP)
Outdoor unit fan	step 1	L tap	H tap+OFF	
	step 2	L tap	L tap+OFF	
Compressor		60Hz	86Hz+OFF	96Hz+OFF

◆ When cooling: Step1 → 2 high pressure > 24 kg/cm² (2.35 MPa)
Step2 → 1 high pressure < 19 kg/cm² (1.86 MPa)

- Low noise control reduces capacity by limiting the fan and compressor. The load when heating is particularly large at night when the outdoor temperature is low, and could result in insufficient capacity.
- During low noise control, retry is unlimited for standby (forced thermostat OFF) produced by high pressure, low pressure or discharge pipe temperature.
- An optional BMS interface adaptor for outdoor units is required for low noise control. For method of connection, see low noise operation in the test operation section.

1.16 Demand Control

When you like to save the power consumption, there are three modes of demand operation which controls forced capacity save for outdoor units via contact input (demand input) from outside in order to control demand.

Demand 1: Holds electric power consumption down to approx. 70%
Demand 2: Holds electric power consumption down to approx. 40%
Demand 3: Forced thermostat OFF

- An optional BMS interface adaptor for outdoor units is required for demand control. For method of connection, see demand operation in the test operation section.
- Control is carried out by limiting the upper limit for frequency of demand 1 and demand 2 as given in the table below.

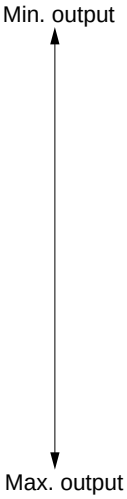
	5HP	8HP	10HP
Demand 1	60Hz	48Hz+ON	60Hz+ON
Demand 2	34Hz	60Hz+OFF	76Hz+OFF
Demand 3	Forced thermostat OFF		

1.17 Compressor Capacity Control

CU-5

Pressure is sampled every 20 seconds by pressure sensor, and the inverter compressor is controlled in 13 stages by microcomputer.
Frequency range: 34 - 116 Hz (13 stages) and common for 50/60Hz area.

Frequency
30Hz
34Hz
38Hz
42Hz
48Hz
54Hz
60Hz
68Hz
76Hz
86Hz
96Hz
106Hz
116Hz

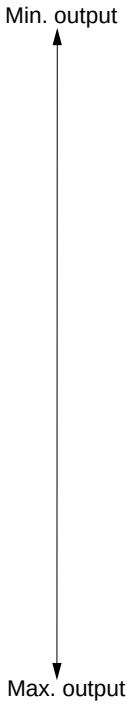


(VE004)

CU-8·10

Pressure is sampled every 20 seconds by two pressure sensors, and the inverter compressor is controlled in 20 stages by microcomputer.

Commercial power supply compressor (off)	Commercial power supply compressor (full load)
Frequency	Frequency
30Hz+OFF	
34Hz+OFF	
38Hz+OFF	
42Hz+OFF	
48Hz+OFF	
54Hz+OFF	
60Hz+OFF	
68Hz+OFF	
76Hz+OFF	
86Hz+OFF	
96Hz+OFF	
106Hz+OFF	
	38Hz+ON
	48Hz+ON
	60Hz+ON
	76Hz+ON
	86Hz+ON
	96Hz+ON
	106Hz+ON
	116Hz+ON



(VE006)

1.18 Te / Tc Setting

You can alter the value of targets Te (evaporating pressure equivalent temperature) and Tc (condensing pressure equivalent temperature) with setting mode 2. PI control is used to control compressor capacity so that Te when cooling and Tc when heating are constant.

Te setting	Set temperature
High	8.5 °C
Standard	5.5 °C
Low	2.5 °C

◆ Target Te changes according to compressor operating frequency, length of piping and indoor load. The range is -10°C ≤ target Te ≤ 5.5°C. (Piping length is determined automatically during oil return operation.)

Tc setting	Set temperature
High	49 °C
Standard	46 °C
Low	43 °C

∗ Target Tc becomes 3°C higher when indoor load is large. Target Tc is controlled in accordance with the following conditions:

◆ Outdoor temp. > 10°C → target Tc ≤ 46°C

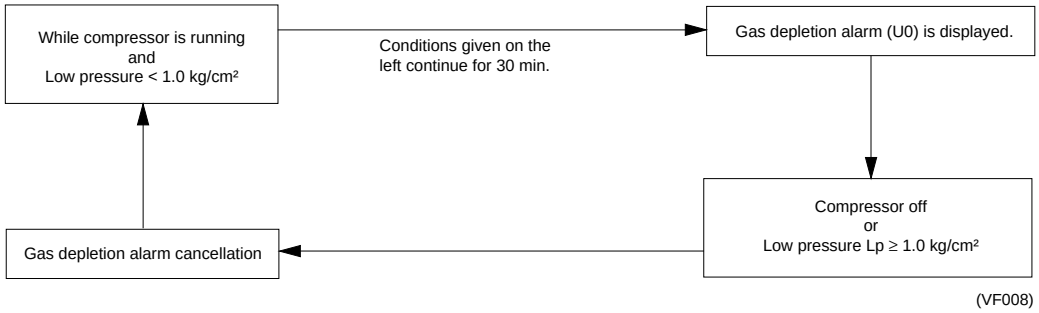
◆ Outdoor temp. ≤ 10°C → target Tc ≤ 49°C

◆ Target Tc
= 43°C when high pressure > 17 kg/cm² (1.67 MPa) and low pressure < 1.8 kg/cm² (0.176 MPa).

1.19 Gas Depletion Alarm

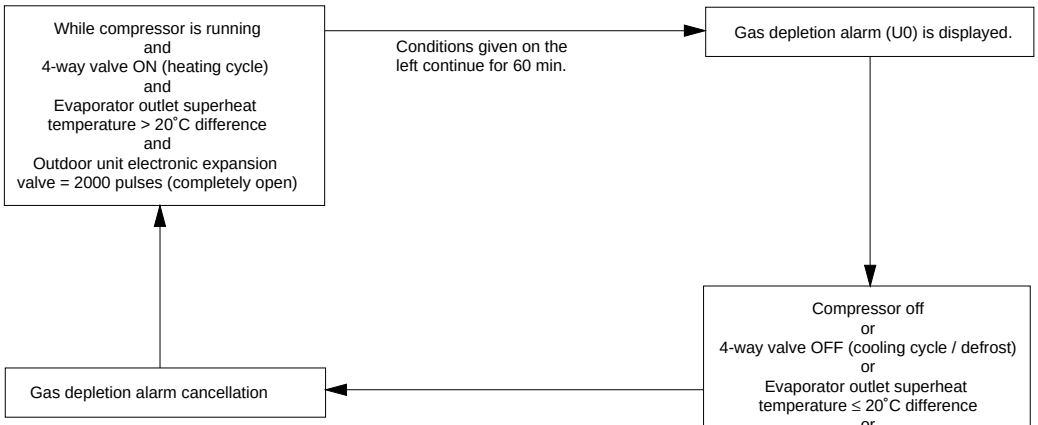
An alarm (U0) is given for severe gas depletion. Alarm is indicated but operation continues.

When cooling



(VF008)

When heating

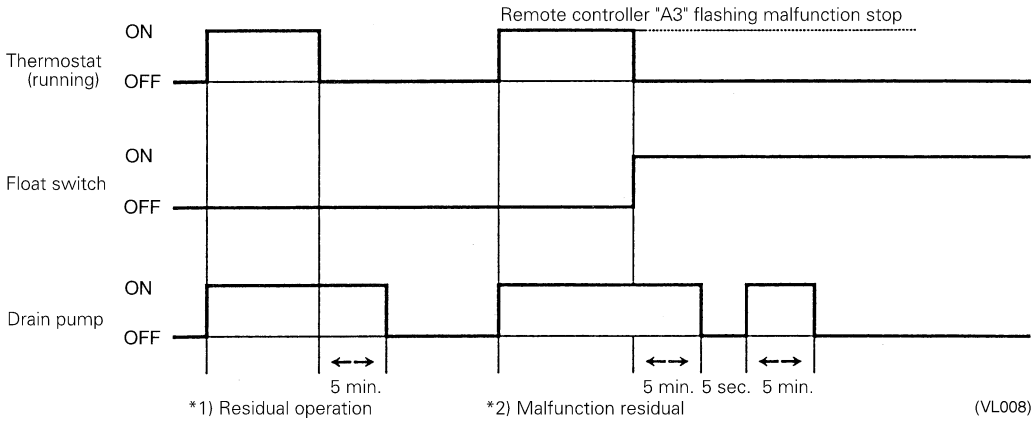


(VF009)

1.20 Drain Pump Control

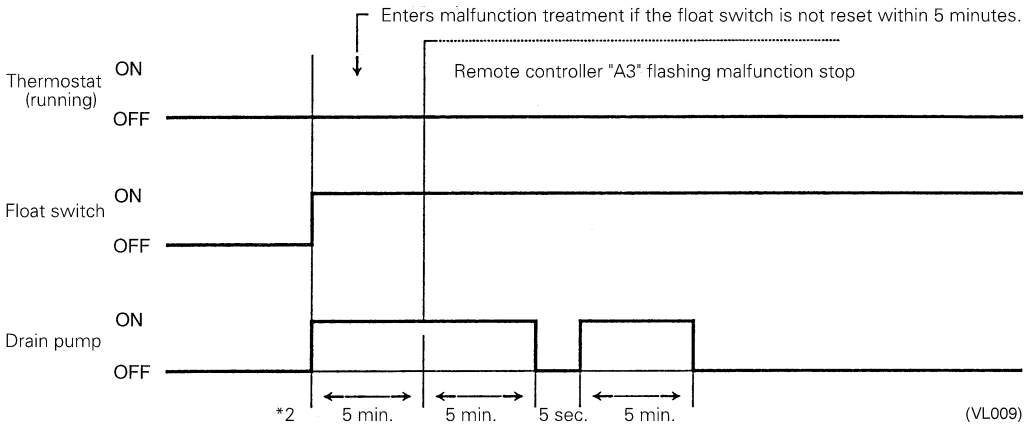
1. The drain pump is controlled by the ON/OFF buttons (4 button (1) - (4) given in the figure below).

1.20.1 When the Float Switch is Tripped while the Cooling Thermostat is ON:

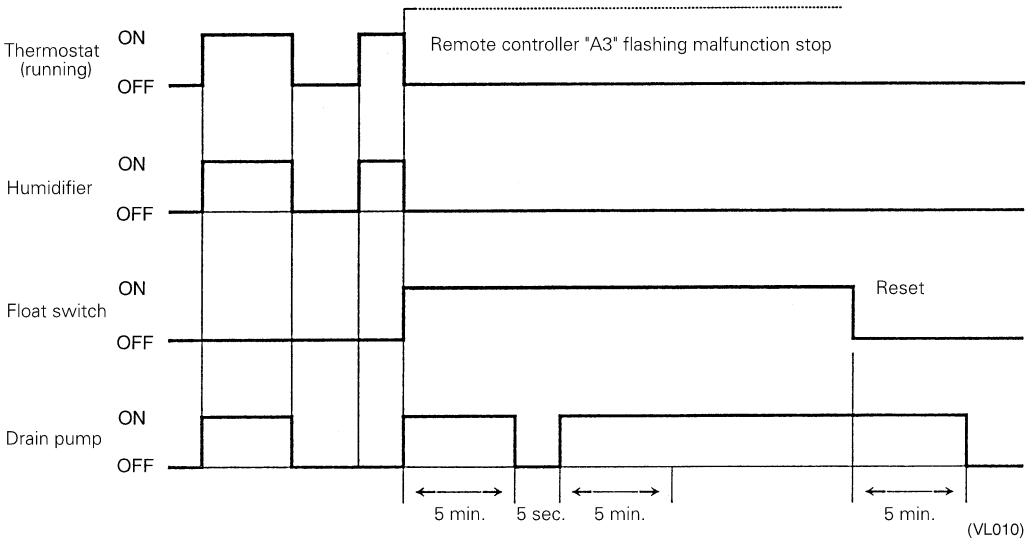


∗ 1. The objective of residual operation is to completely drain any moisture adhering to the fin of the indoor unit heat exchanger when the thermostat goes off during cooling operation.
∗ 2. One cycle consists of 5 minutes of operation, 5 seconds stop, and another 5 minutes of operation.

1.20.2 When the Float Switch is Tripped during Cooling OFF by Thermostat:

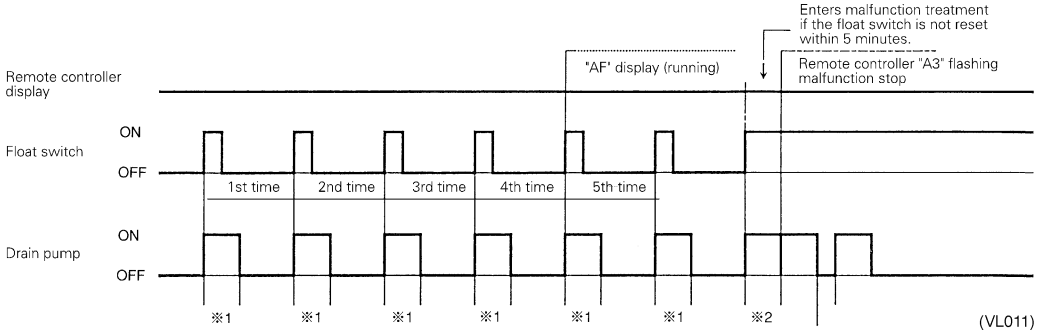


1.20.3 When the Float Switch is Tripped during Heating Operation:



During heating operation, if the float switch is not reset even after the 5 minutes operation, 5 seconds stop, 5 minutes operation cycle ends, operation continues until the switch is reset.

1.20.4 When the Float Switch is Tripped and “AF” is Displayed on the Remote Controller:

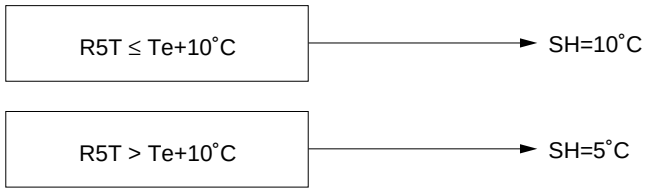


Note: If the float switch is tripped five times in succession, a drain malfunction is determined to have occurred. “AF” is then displayed as operation continues.

1.21 Oil Temperature Sensor (8 and 10 Hp only)

1.21.1 Prevention of Wetness during Heating

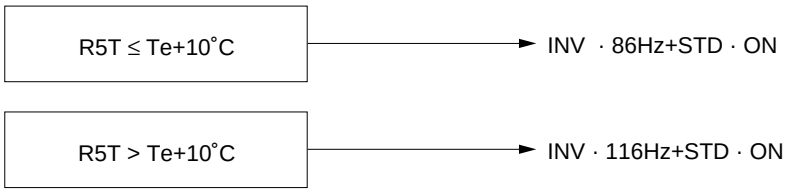
◆ Wet operation is prevented by modification of super heating (SH) by oil temperature sensor (R5T). (Low equivalent pressure = Te)



(VF010)

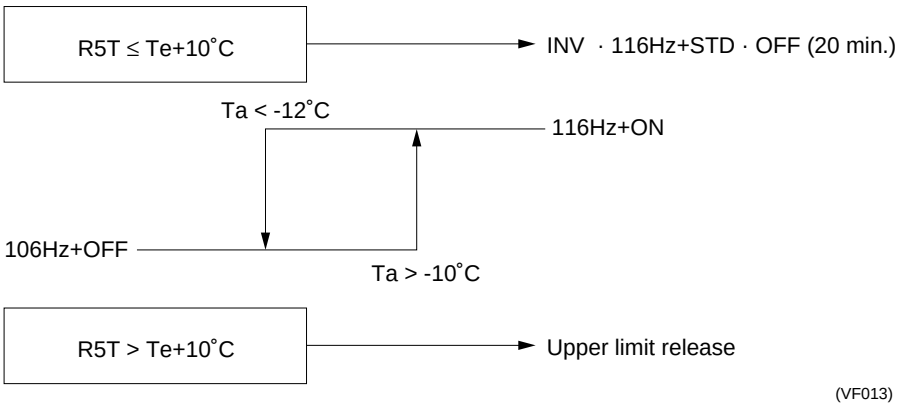
1.21.2 Prevention of Oil Dilution during Defrost

◆ The unit controls upper limit frequency of the compressor and is designed to prevent oil from being diluted while defrosting by means of an oil temperature sensor.



(VF083)

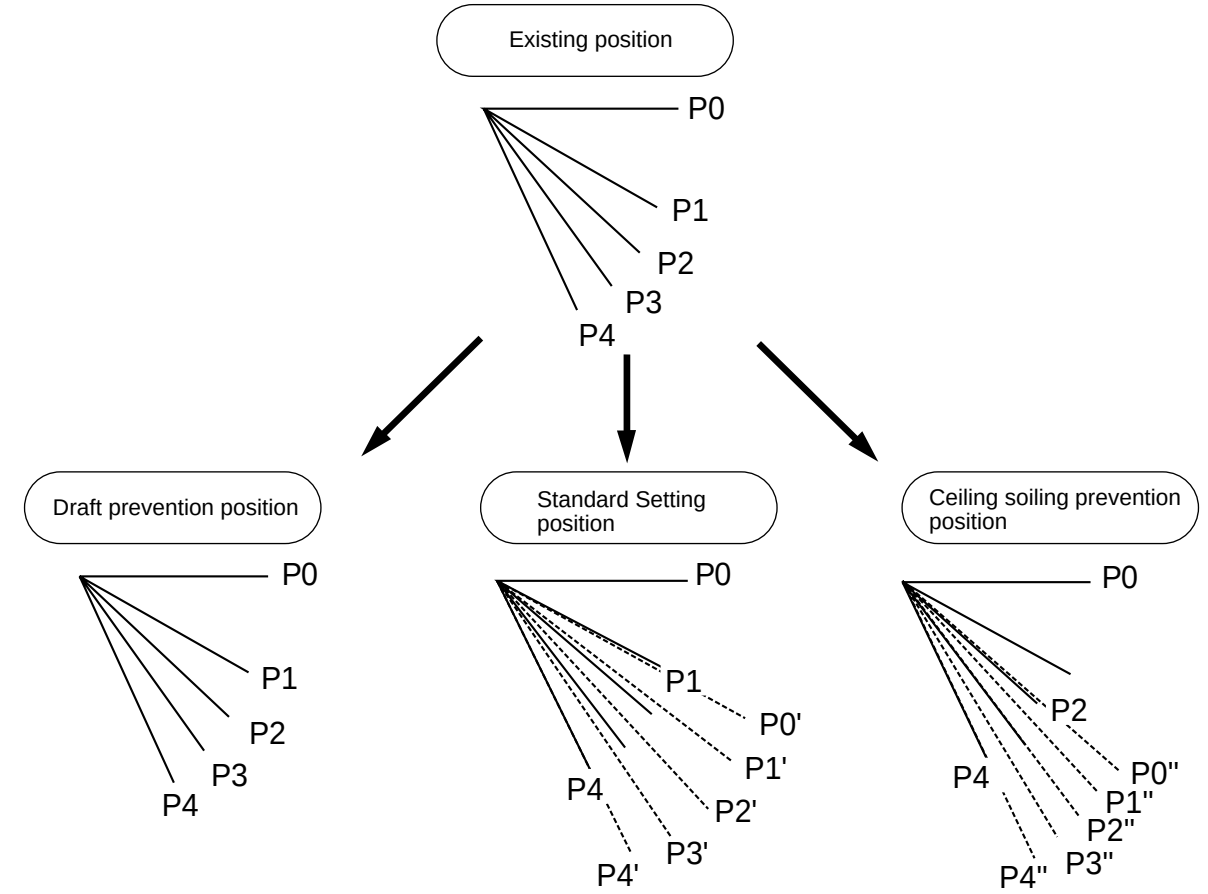
◆ Startup subsequent to defrosting is improved by the oil temperature sensor.



(VF013)

1.22 Louver Control for Preventing Ceiling Dirt

We have added a control feature that allows you to select the range of in which air direction can be adjusted in order to prevent the ceiling surrounding the air discharge outlet of ceiling mounted cassette type units from being soiled. (This feature is available on 2-way cassette, 4-way cassette and corner types.)



Draft prevention position	P0	P1	P2	P3	P4	Same as existing position
		Range of direction adjustment				
Standard position	Prohibited	P0'	P1'	P2'	P3'	P4'	Separated into 5 positions (P1 - 4)
		Range of direction adjustment				
Dirt prevention position	Prohibited	P0"	P1"	P2"	P3"	P4"	Separated into 5 positions (P2 - 4)

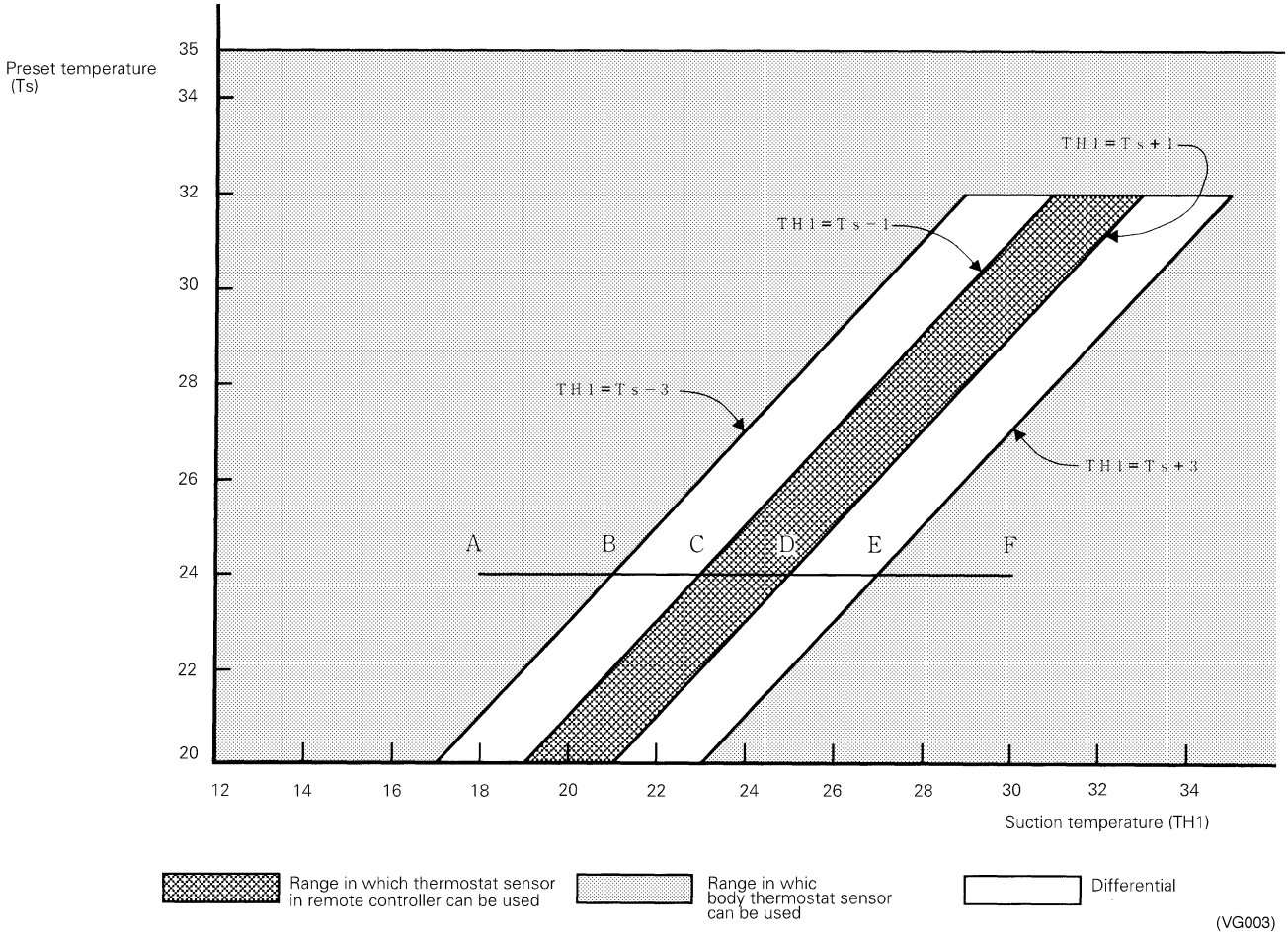
The factory set position is standard position. (VL012)

1.23 Thermostat Sensor in Remote Controller

Temperature is controlled by both the thermostat sensor in remote controller and air suction thermostat in the indoor unit. (This is however limited to when the field setting for the thermostat sensor in remote controller is set to “Use”.)

Cooling

If there is a significant difference in the preset temperature and the suction temperature, fine adjustment control is carried out using a body thermostat sensor, or using the sensor in the remote controller near the position of the user when the suction temperature is near the preset temperature.



■ **Ex: When cooling**

Assuming the preset temperature in the figure above is 24°C, and the suction temperature has changed from 18°C to 30°C (A → F):

(This example also assumes there are several other air conditioners, the UM system is off, and that temperature changes even when the thermostat sensor is off.)

Body thermostat sensor is used for temperatures from 18°C to 23°C (A → C).

Remote controller thermostat sensor is used for temperatures from 23°C to 27°C (C → E).

Body thermostat sensor is used for temperatures from 27°C to 30°C (E → F).

And, assuming suction temperature has changed from 30°C to 18°C (F → A):

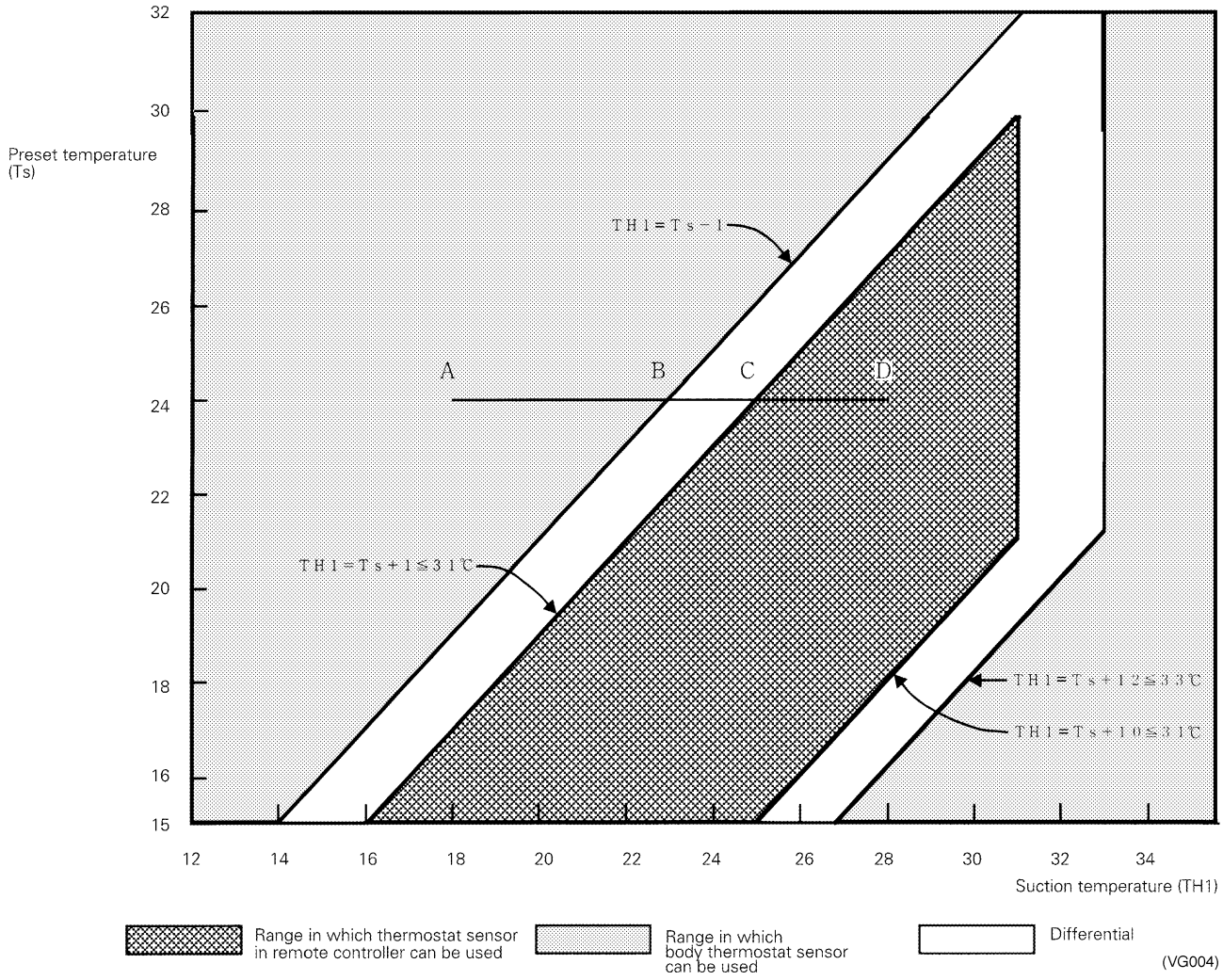
Body thermostat sensor is used for temperatures from 30°C to 25°C (F → D).

Remote controller thermostat sensor is used for temperatures from 25°C to 21°C (D → B).

Body thermostat sensor is used for temperatures from 21°C to 18°C (B → A).

Heating

When heating, the hot air rises to the top of the room, resulting in the temperature being lower near the floor where the occupants are. When controlling by body thermostat sensor only, the unit may therefore be turned off by the thermostat before the lower part of the room reaches the preset temperature. The temperature can be controlled so the lower part of the room where the occupants are doesn't become cold by widening the range in which thermostat sensor in remote controller can be used so that suction temperature is higher than the preset temperature.



■ **Ex: When heating**

Assuming the preset temperature in the figure above is 24°C, and the suction temperature has changed from 18°C to 28°C (A → F):

(This example also assumes there are several other air conditioners, the UM system is off, and that temperature changes even when the thermostat sensor is off.)

Body thermostat sensor is used for temperatures from 18°C to 25°C (A → C).

Remote controller thermostat sensor is used for temperatures from 25°C to 28°C (C → E).

And, assuming suction temperature has changed from 28°C to 18°C (D → A):

Remote controller thermostat sensor is used for temperatures from 28°C to 23°C (D → B).

Body thermostat sensor is used for temperatures from 23°C to 18°C (B → A).

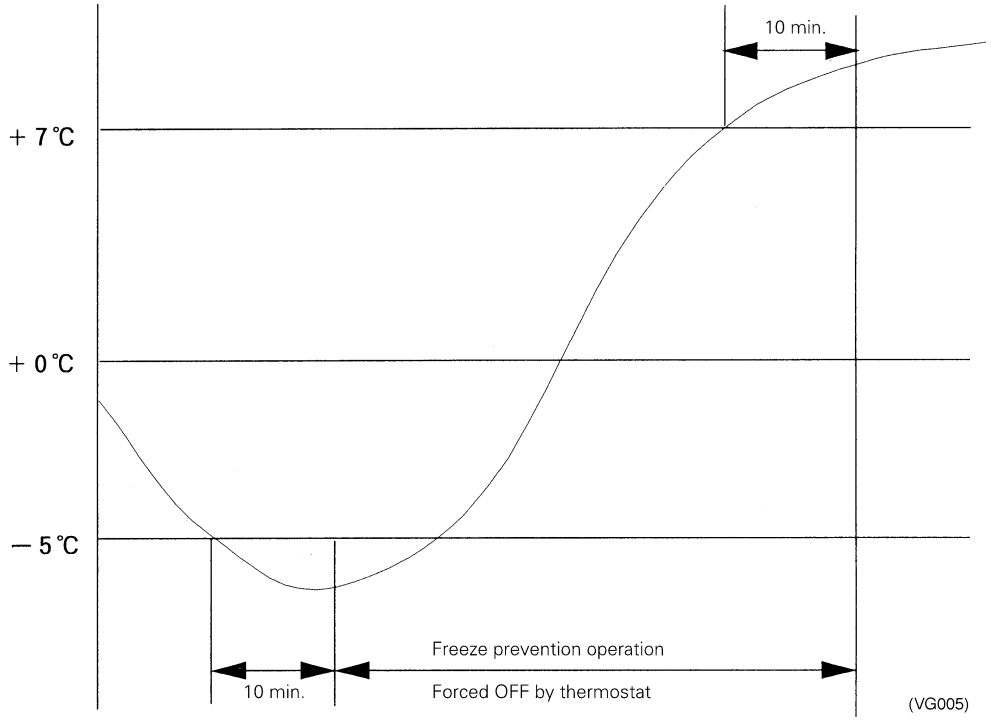
1.24 Freeze Prevention

Freeze Prevention by Off Cycle (Indoor Unit)

When the temperature detected by liquid pipe temperature thermistor (R2T) of the indoor unit heat exchanger drops too low, the unit enters freeze prevention operation in accordance with the following conditions, and is also set in accordance with the conditions given below.

Conditions for starting freeze prevention: Temperature is -1°C or less for total of 40 min., or temperature is -5°C or less for total of 10 min.
Conditions for stopping freeze prevention: Temperature is +7°C or more for 10 min. continuously

Ex: Case where temperature is -5°C or less for total of 10 min.



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Test Operation

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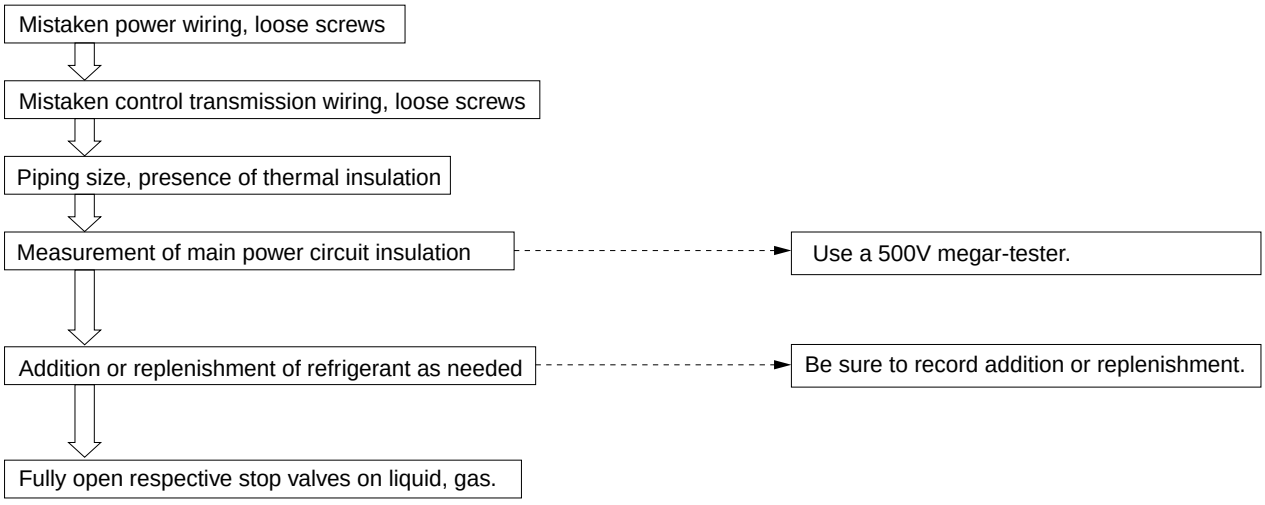
1. Test Operation

1.1 Procedure and Outline

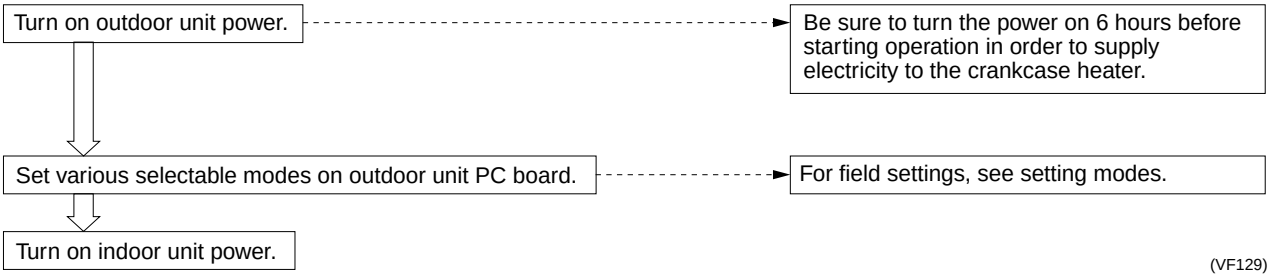
The operation sequence is the most important thing for test operation. Follow the following outline.

1.1.1 Check The Following Before Turning Power On.


Mistaken power wiring, loose screws
Mistaken control transmission wiring, loose screws
Piping size, presence of thermal insulation
Measurement of main power circuit insulation
Use a 500V megar-tester.
Addition or replenishment of refrigerant as needed
Be sure to record addition or replenishment.
Fully open respective stop valves on liquid, gas.

(VF128)

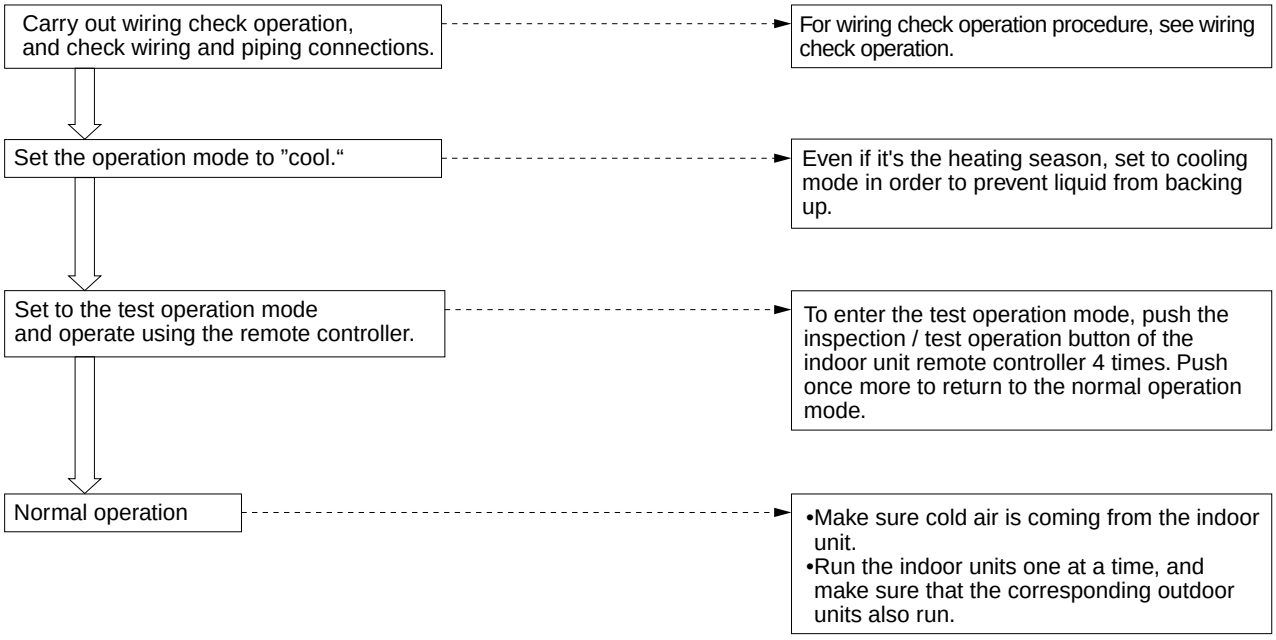
1.1.2 Turn Power On.


Turn on outdoor unit power.
Be sure to turn the power on 6 hours before starting operation in order to supply electricity to the crankcase heater.
Set various selectable modes on outdoor unit PC board.
For field settings, see setting modes.
Turn on indoor unit power.

(VF129)

Note: Refer to Setting Modes on P67,73

1.1.3 Check Operation.


Carry out wiring check operation, and check wiring and piping connections.
For wiring check operation procedure, see wiring check operation.
Set the operation mode to ”cool.“
Even if it's the heating season, set to cooling mode in order to prevent liquid from backing up.
Set to the test operation mode and operate using the remote controller.
To enter the test operation mode, push the inspection / test operation button of the indoor unit remote controller 4 times. Push once more to return to the normal operation mode.
Normal operation
•Make sure cold air is coming from the indoor unit.
•Run the indoor units one at a time, and make sure that the corresponding outdoor units also run.

(VF130)

Note: Refer to Wiring Check Operation on P98

Caution
When the 400 volt power supply is applyed to "N" phase by mistake, replace Inverter P.C.B (A2P) and control transformer (T1R, T2R) in switch box together.

(V0847)

1.2 When Power is Turned On

1.2.1 When Turning Power on the First Time

The unit will not run for up to 12 minutes in order for master power supply and address (indoor unit address, etc.) to be set automatically.

Outdoor unit
Warning lamp (HWL) ..... On
Test lamp (H2P) ..... Flicker
Can be set while in operation.

Indoor unit
"UH" malfunction code flickers when the ON/OFF button is pushed during the aforementioned operation.
(Returns to normal when automatic setting is complete.)

1.2.2 When Turning Power on after the First Time

∗ Tap the RESET button on the outdoor unit PC Board. The unit can be operated after setting up for about two minutes.
If the RESET button is not pushed, the unit will not run for up to 10 minutes in order for master power supply to be set automatically.

Outdoor unit
HWL lamp ..... On
Test lamp (H2P) ..... Flicker
Can be set while in operation.

Indoor unit
If the ON/OFF button is pushed during the aforementioned operation, the operation lamp lights but the unit will not run.
(Returns to normal when automatic setting is complete.)

1.2.3 If outdoor, indoor or HR box is extended, or if indoor/outdoor unit PC board is replaced:

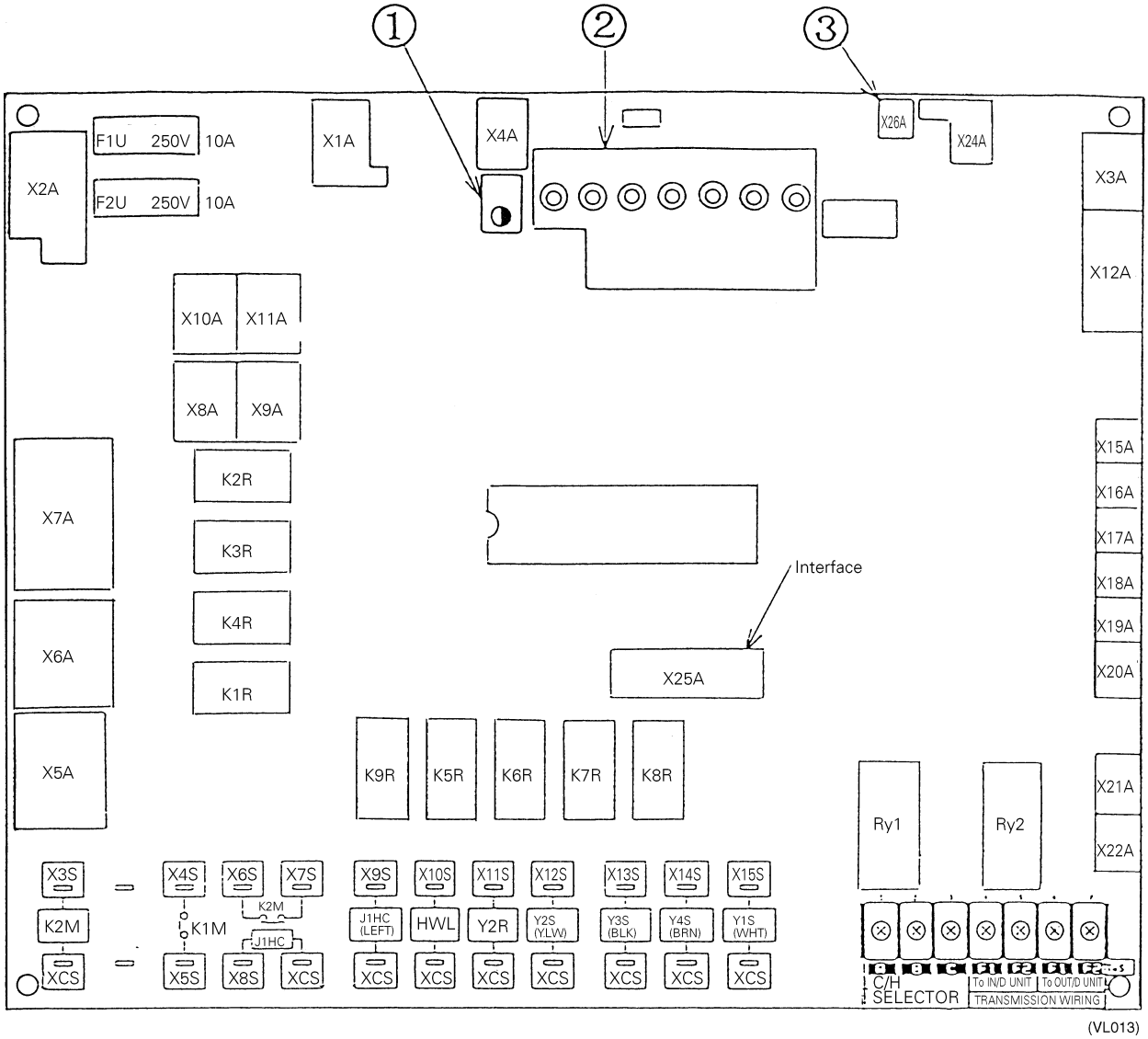
In these cases, be sure to push and hold the RESET button for 5 seconds or more. The system will not recognize the extension if this operation is not performed. The unit will not run for up to 12 minutes in order for the addresses (indoor unit address, etc.) to be set automatically.

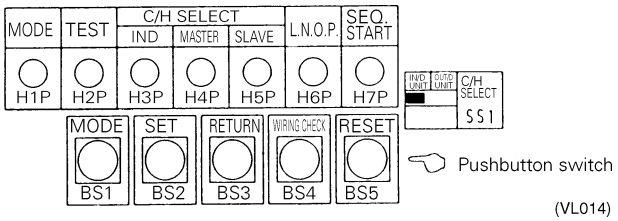
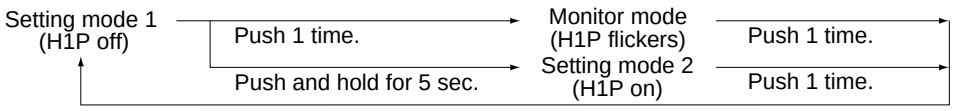
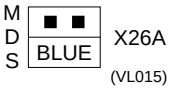
Outdoor unit
Warning lamp (HWL) ..... On
Test lamp (H2P) ..... Flicker
Can be set while in operation.

Indoor unit
"UH" or "U4" malfunction code flickers when the ON/OFF button is pushed during the aforementioned operation.
(Returns to normal when automatic setting is complete.)

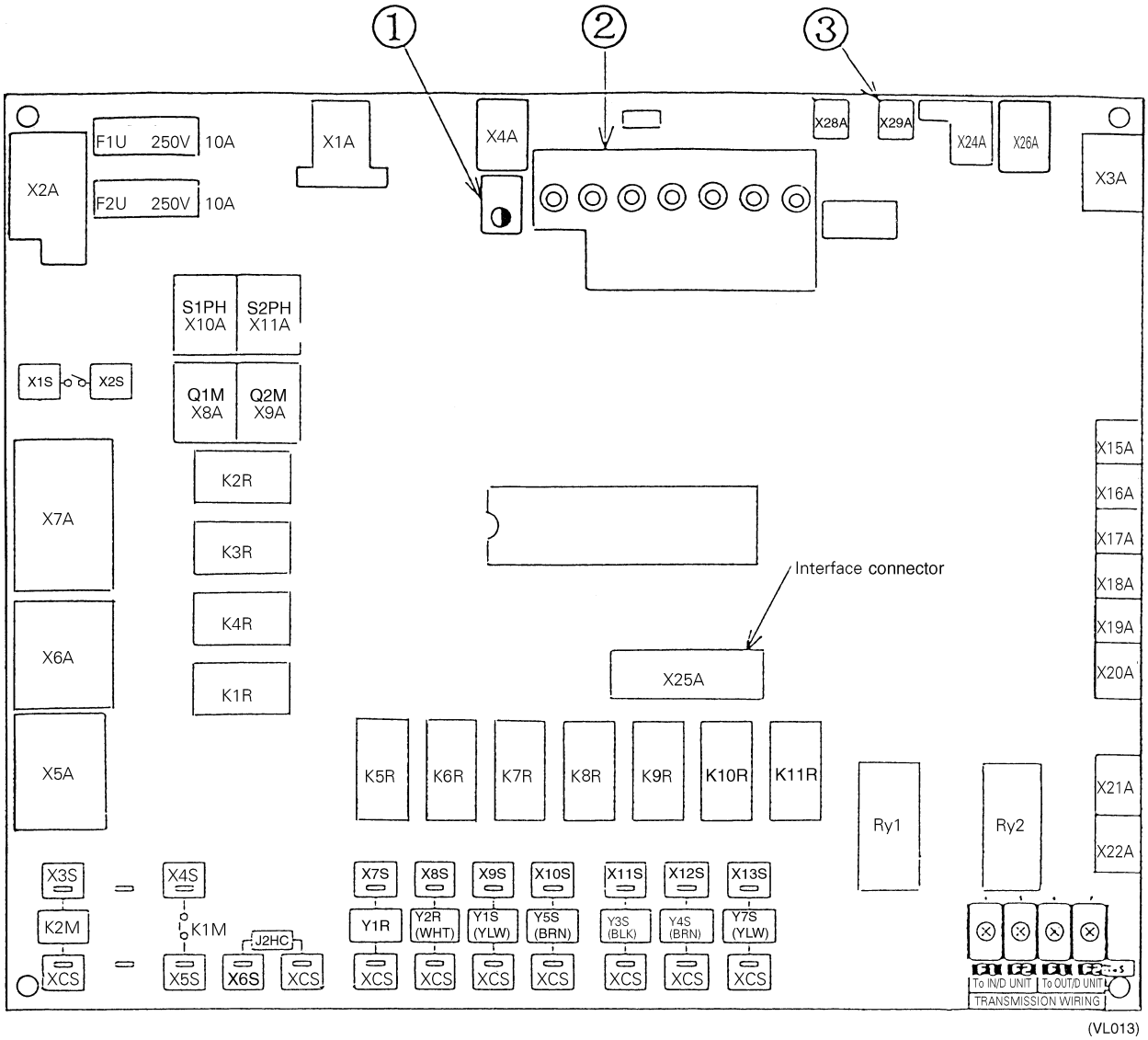
1.3 Outdoor Unit PC Board Ass'y

1.3.1 CU-8·10MX1SPE

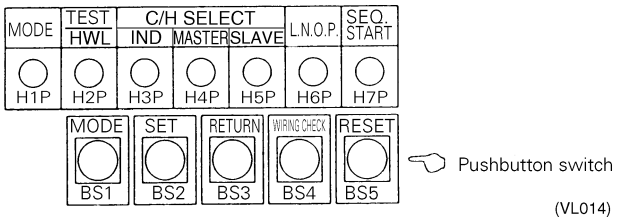
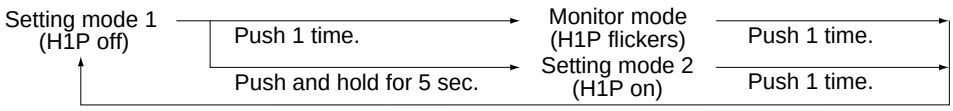
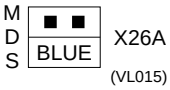


1	Service monitor <HAP> (Green)	Normal ..... Flicker Malfunction ..... On or off
2	Function setting switch or LED LED display ○ : On ◑ : Flicker ● : Off	 (VL014) Mode button ..... Mode change  (VF014) • Set return button ..... Changes or enters address or data. • Wiring check button .... Push and hold for 5 sec. to start wiring check. • Reset button ..... Push and hold for 5 sec. if the indoor unit's PC board has been replaced, or there has been a change in the combination of indoor and outdoor units, such as indoor unit extension, etc.
3	Jumper pin  (VL015)	Forced defrost operation by short circuit.

1.3.2 CU-8·10ME1XPA (Heat Recovery)



(VL013)

1	Service monitor <HAP> (Green)	Normal ..... Flicker Malfunction ..... On or off
2	Function setting switch or LED LED display ○ : On ◑ : Flicker ● : Off	 (VL014) Mode button ..... Mode change  (VF014) • Set return button ..... Changes or enters address or data. • Wiring check button .... Push and hold for 5 sec. to start wiring check. • Reset button ..... Push and hold for 5 sec. if the indoor unit's PC board has been replaced, or there has been a change in the combination of indoor and outdoor units, such as indoor unit extension, etc.
3	Jumper pin  (VL015)	Forced defrost operation by short circuit.

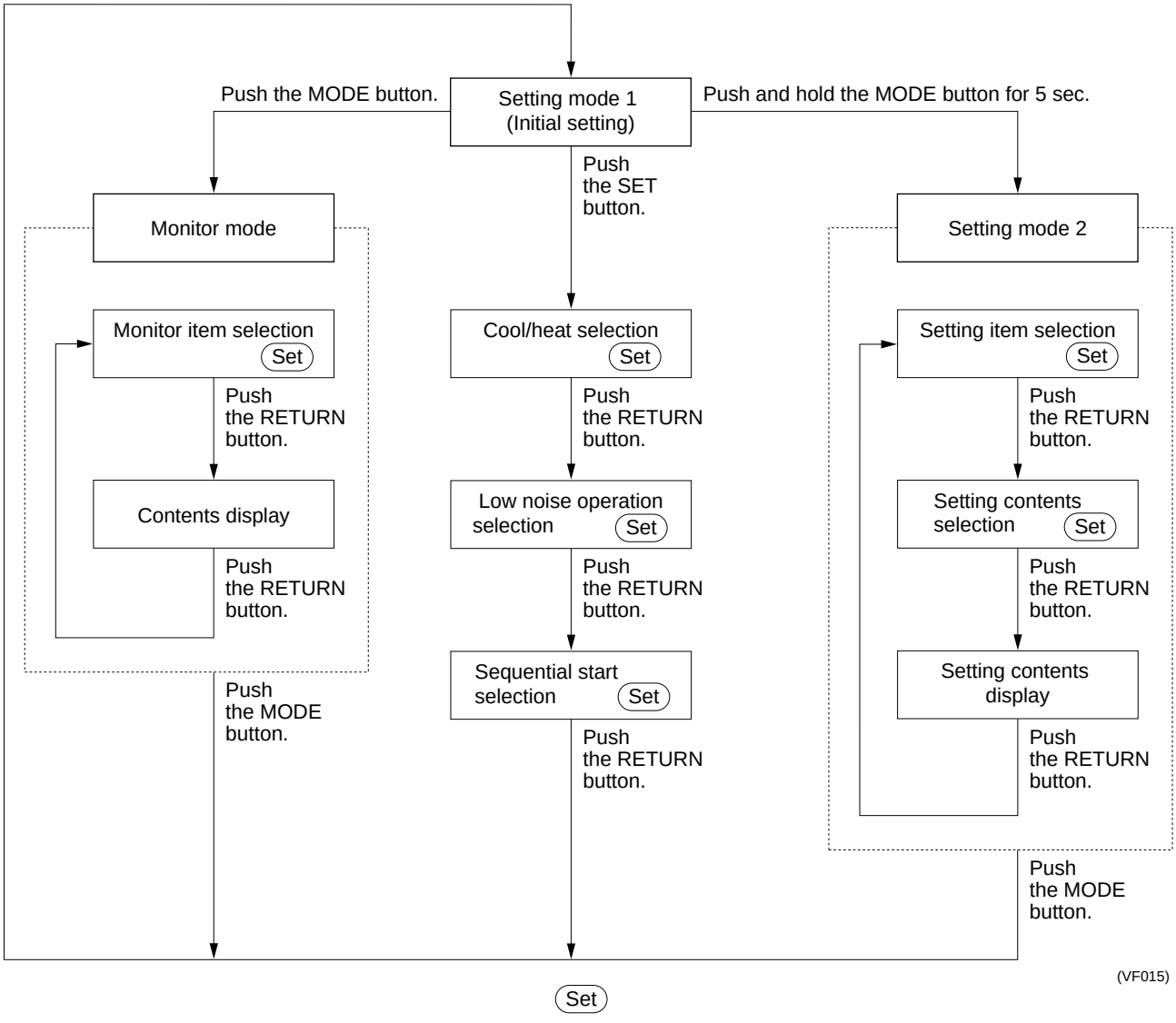
1.4 Setting Modes (MX1 Series)

The three setting modes are as follows:

- ◆ **Setting mode 1 .....** Mode for selecting cool/heat setting method, and whether or not to use low noise operation and sequential start. (H1P off)
- ◆ **Setting mode 2 .....** Mode for changing operating status and setting addresses; used primarily for service. (H1P on)
- ◆ **Monitor mode .....** Mode for checking setting made in the setting modes, number of connected units, etc. (H1P flickers)

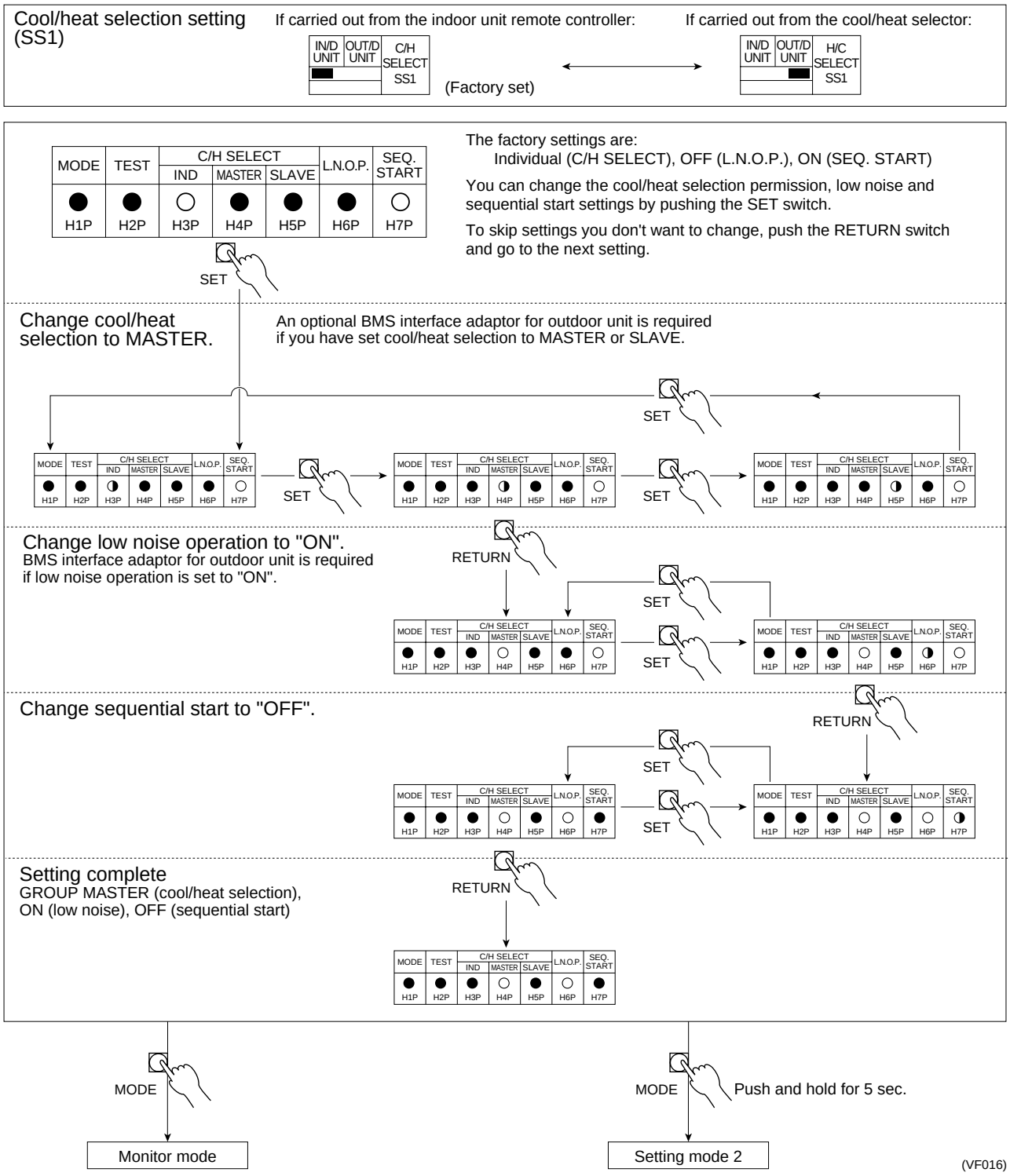
Mode Changing Procedure

The flow of the setting modes is as follows. (See the following pages for details.)



- ■ You can make your selections with the SET button.
- ■ **If you become unsure of how to proceed, push the MODE button and return to setting mode 1.**
- ■ You don't have to perform power supply reset after changing settings in setting mode 1 (including [SS1] cool/heat selection switch on the outdoor unit PC board) and setting mode 2.

1.4.1 Setting Mode 1


Cool/heat selection setting (SS1)
If carried out from the indoor unit remote controller:
If carried out from the cool/heat selector:
IN/D UNIT
OUT/D UNIT
C/H SELECT SS1
H/C SELECT SS1
(Factory set)
MODE
TEST
C/H SELECT
IND
MASTER
SLAVE
L.N.O.P.
SEQ. START
H1P
H2P
H3P
H4P
H5P
H6P
H7P
SET
The factory settings are:
Individual (C/H SELECT), OFF (L.N.O.P.), ON (SEQ. START)
You can change the cool/heat selection permission, low noise and sequential start settings by pushing the SET switch.
To skip settings you don't want to change, push the RETURN switch and go to the next setting.
Change cool/heat selection to MASTER.
An optional BMS interface adaptor for outdoor unit is required if you have set cool/heat selection to MASTER or SLAVE.
Change low noise operation to "ON".
BMS interface adaptor for outdoor unit is required if low noise operation is set to "ON".
RETURN
Change sequential start to "OFF".
Setting complete
GROUP MASTER (cool/heat selection), ON (low noise), OFF (sequential start)
MODE
Monitor mode
Push and hold for 5 sec.
Setting mode 2
(VF016)

Note:
1. CU-5 is completed by low noise setting.
2. BMS interface adaptor for outdoor unit is required if cool/heat selection set to MASTER or SLAVE, or if low noise operation is set to ON. For further information, see page 80.

1.4.2 Setting Mode 2

To enter setting mode 2 from setting mode 1 (normal), you must push and hold the MODE button (BS1) for 5 seconds. (Setting mode 2 cannot be entered while still making settings in setting mode 1.)

Setting procedure

1. Push the SET button and match with the setting item (LED display). (All 10 settings)
↓
2. Push the RETURN button (BS3) and the present settings flicker (LED display).
↓
3. Push the SET button (BS2) and match with each setting (LED flicker display).
↓
4. Push the RETURN button (BS3) and enter the settings.
↓
5. Push the RETURN button (BS3) and return to the initial status.

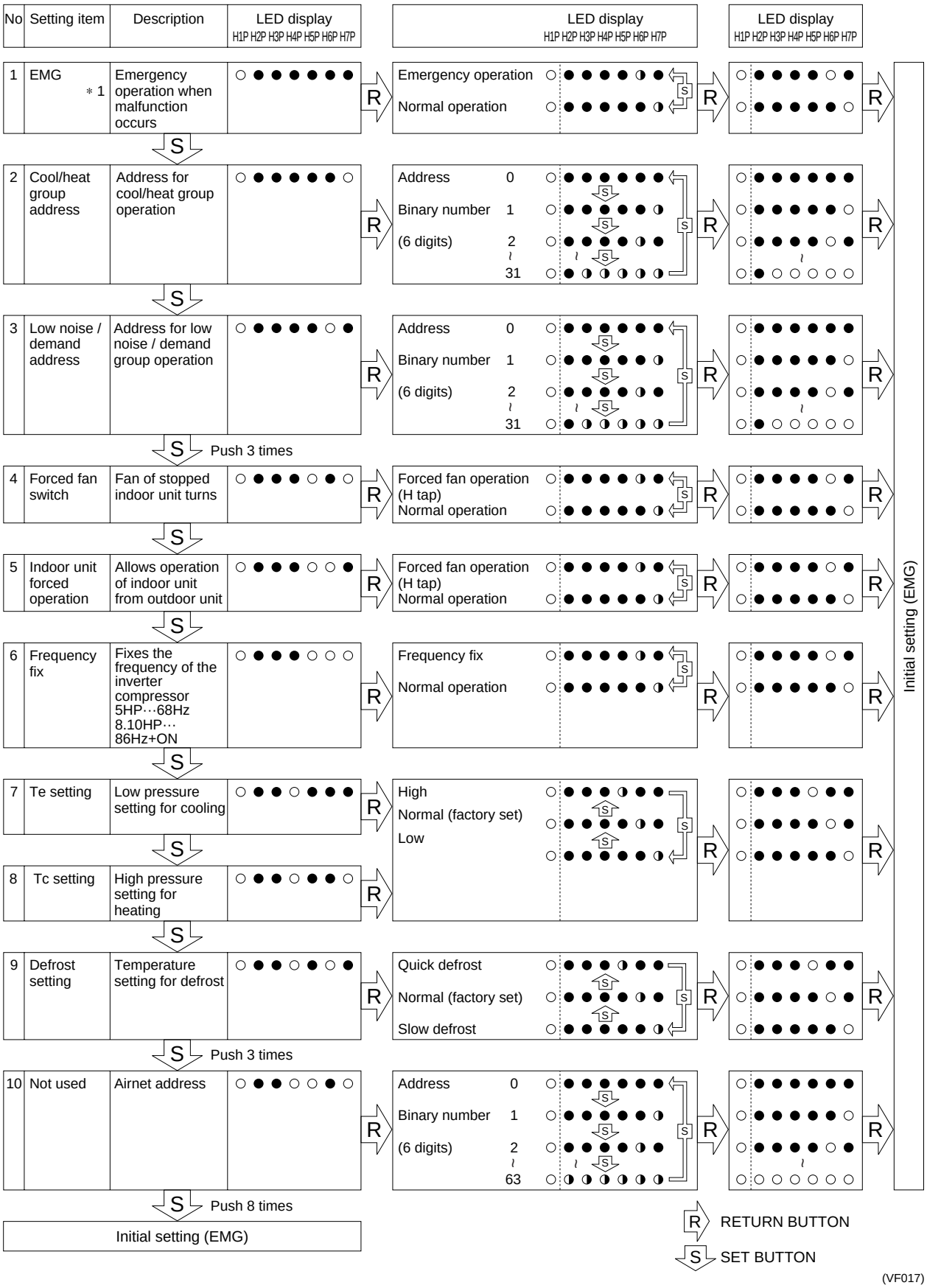
Note:
- If you become unsure of how to proceed, push the MODE button (BS1) and return to setting mode 1.
- The initial status of setting mode 2 is the status of setting item No. 1 in mode 2.

Setting items

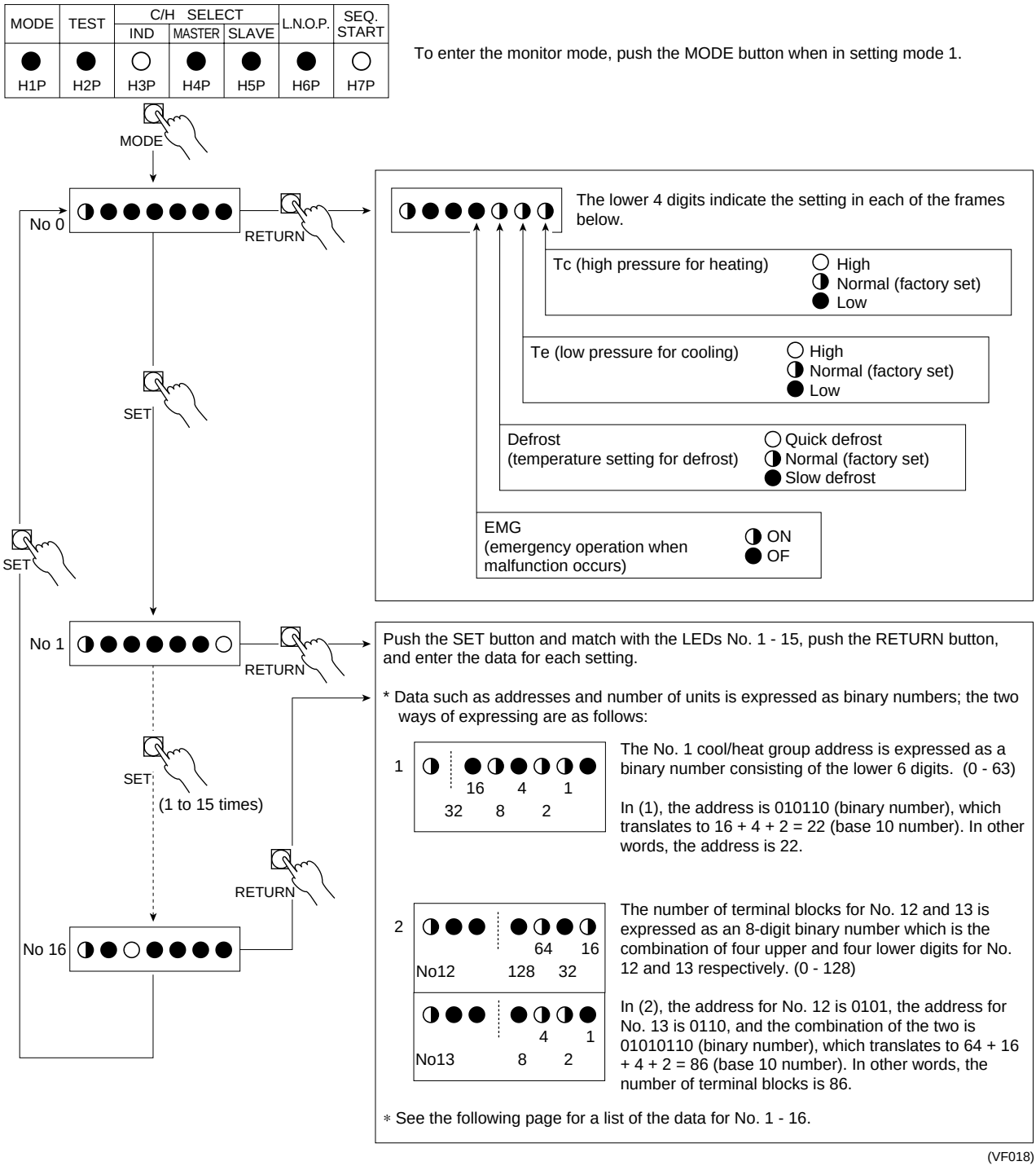
	Setting item	Description	LED display H1P H2P H3P H4P H5P H6P H7P		LED display H1P H2P H3P H4P H5P H6P H7P
1	EMG ∗1	Emergency operation when malfunction occurs	○ ● ● ● ● ● ●	Emergency operation (Runs only by standard compressor) Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
2	Cool/heat group address	Address for cool/heat group operation	○ ● ● ● ● ● ○	Address Binary number (6 digits) 0 1 2 〜 31	○ ● ● ● ● ● ● ○ ● ● ● ● ● ○ ○ ● ● ● ● ○ ● 〜 ○ ● ○ ○ ○ ○ ○
3	Low noise / demand address	Address for low noise / demand group operation	○ ● ● ● ● ○ ●	Address Binary number (6 digits) 0 1 2 〜 31	○ ● ● ● ● ● ● ○ ● ● ● ● ● ○ ○ ● ● ● ● ○ ● 〜 ○ ● ○ ○ ○ ○ ○
4	Forced fan switch	Fan of stopped indoor unit turns	○ ● ● ● ○ ● ○	Forced fan operation (H tap) Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
5	Indoor unit forced operation	Allows operation of indoor unit from outdoor unit	○ ● ● ● ○ ○ ●	Indoor unit forced operation Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
6	Frequency fix	Fixes the frequency of the inverter compressor 5HP···68Hz 8.10HP··86Hz+ON	○ ● ● ● ○ ○ ○	Frequency fix Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
7	Te setting	Low pressure setting for cooling	○ ● ● ○ ● ● ●	High Normal (factory set) Low	○ ● ● ● ○ ● ● ○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
8	Tc setting	High pressure setting for heating	○ ● ● ○ ● ● ○		
9	Defrost setting	Temperature setting for defrost	○ ● ● ○ ● ○ ●	Quick defrost Normal (factory set) Slow defrost	○ ● ● ● ○ ● ● ○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
10	Not used	Airnet address	○ ● ● ○ ○ ● ○	Address Binary number (6 digits) 0 1 2 〜 63	○ ● ● ● ● ● ● ○ ● ● ● ● ● ○ ○ ● ● ● ● ○ ● 〜 ○ ○ ○ ○ ○ ○ ○

(VF084)

Note: ∗ 1: Cannot be set with CU-5.


No
Setting item
Description
LED display
H1P H2P H3P H4P H5P H6P H7P
1 EMG ＊1 Emergency operation when malfunction occurs
2 Cool/heat group address Address for cool/heat group operation
3 Low noise / demand address Address for low noise / demand group operation
4 Forced fan switch Fan of stopped indoor unit turns
5 Indoor unit forced operation Allows operation of indoor unit from outdoor unit
6 Frequency fix Fixes the frequency of the inverter compressor 5HP…68Hz 8.10HP… 86Hz+ON
7 Te setting Low pressure setting for cooling
8 Tc setting High pressure setting for heating
9 Defrost setting Temperature setting for defrost
10 Not used Airnet address
Emergency operation
Normal operation
Address
Binary number
(6 digits)
0
1
2
31
Forced fan operation (H tap)
Normal operation
Frequency fix
High
Normal (factory set)
Low
Quick defrost
Slow defrost
63
Push 3 times
Push 8 times
Initial setting (EMG)
R RETURN BUTTON
S SET BUTTON
(VF017)

1.4.3 Monitor Mode


MODE
TEST
C/H SELECT
IND
MASTER
SLAVE
L.N.O.P.
SEQ. START
H1P
H2P
H3P
H4P
H5P
H6P
H7P
To enter the monitor mode, push the MODE button when in setting mode 1.
MODE
No 0
RETURN
The lower 4 digits indicate the setting in each of the frames below.
Tc (high pressure for heating)
High
Normal (factory set)
Low
Te (low pressure for cooling)
High
Normal (factory set)
Low
SET
Defrost
(temperature setting for defrost)
Quick defrost
Normal (factory set)
Slow defrost
EMG
(emergency operation when malfunction occurs)
ON
OF
SET
No 1
RETURN
Push the SET button and match with the LEDs No. 1 - 15, push the RETURN button, and enter the data for each setting.
* Data such as addresses and number of units is expressed as binary numbers; the two ways of expressing are as follows:
1
16 4 1
32 8 2
The No. 1 cool/heat group address is expressed as a binary number consisting of the lower 6 digits. (0 - 63)
In (1), the address is 010110 (binary number), which translates to 16 + 4 + 2 = 22 (base 10 number). In other words, the address is 22.
SET
(1 to 15 times)
RETURN
No 16
2
64 16
No12 128 32
4 1
No13 8 2
The number of terminal blocks for No. 12 and 13 is expressed as an 8-digit binary number which is the combination of four upper and four lower digits for No. 12 and 13 respectively. (0 - 128)
In (2), the address for No. 12 is 0101, the address for No. 13 is 0110, and the combination of the two is 01010110 (binary number), which translates to 64 + 16 + 4 + 2 = 86 (base 10 number). In other words, the number of terminal blocks is 86.
* See the following page for a list of the data for No. 1 - 16.

(VF018)

- After making sure the data is correct, push the RETURN button and return to No. 0, or push the MODE button and return to setting mode 1.

Monitor Mode Data

Mode No.	LED	Data	Display method	Size (binary number)
No 1	○●●●●○	Cool/heat group address	0 ~ 31	Lower 6 digits
No 2	○●●●●○●	Low noise / demand address	0 ~ 31	Lower 6 digits
No 3	○●●●●○○	Not used		
No 4	○●●●○●●	Not used	0 ~ 63	Lower 6 digits
No 5	○●●●○●○	Number of connected units	0 ~ 63 units	Lower 6 digits
No 6	○●●●○○●	Number of connected HR boxes	0 ~ 63 units	Lower 6 digits
No 7	○●●●○○○	Number of connected zone units (excluding outdoor and HR boxes)	0 ~ 63 units	Lower 6 digits
No 8	○●●○●●●	Number of outdoor units	0 ~ 63 units	Lower 6 digits
No 9	○●●○●●○	Number of HR boxes	0 ~ 128 units	Lower 4 digits, upper
No 10	○●●○●○●	Number of HR boxes	0 ~ 128 units	Lower 4 digits, lower
No 11	○●●○●○○	Number of zone units (excluding outdoor and HR boxes)	0 ~ 63 units	Lower 6 digits
No 12	○●●○○●●	Number of terminal blocks	0 ~ 128 units	Lower 4 digits, upper
No 13	○●●○○●○	Number of terminal blocks	0 ~ 128 units	Lower 4 digits, lower
No 14	○●●○○○●	Not used		
No 15	○●●○○○○	Not used		
No 16	○●○●●●●	Not used		

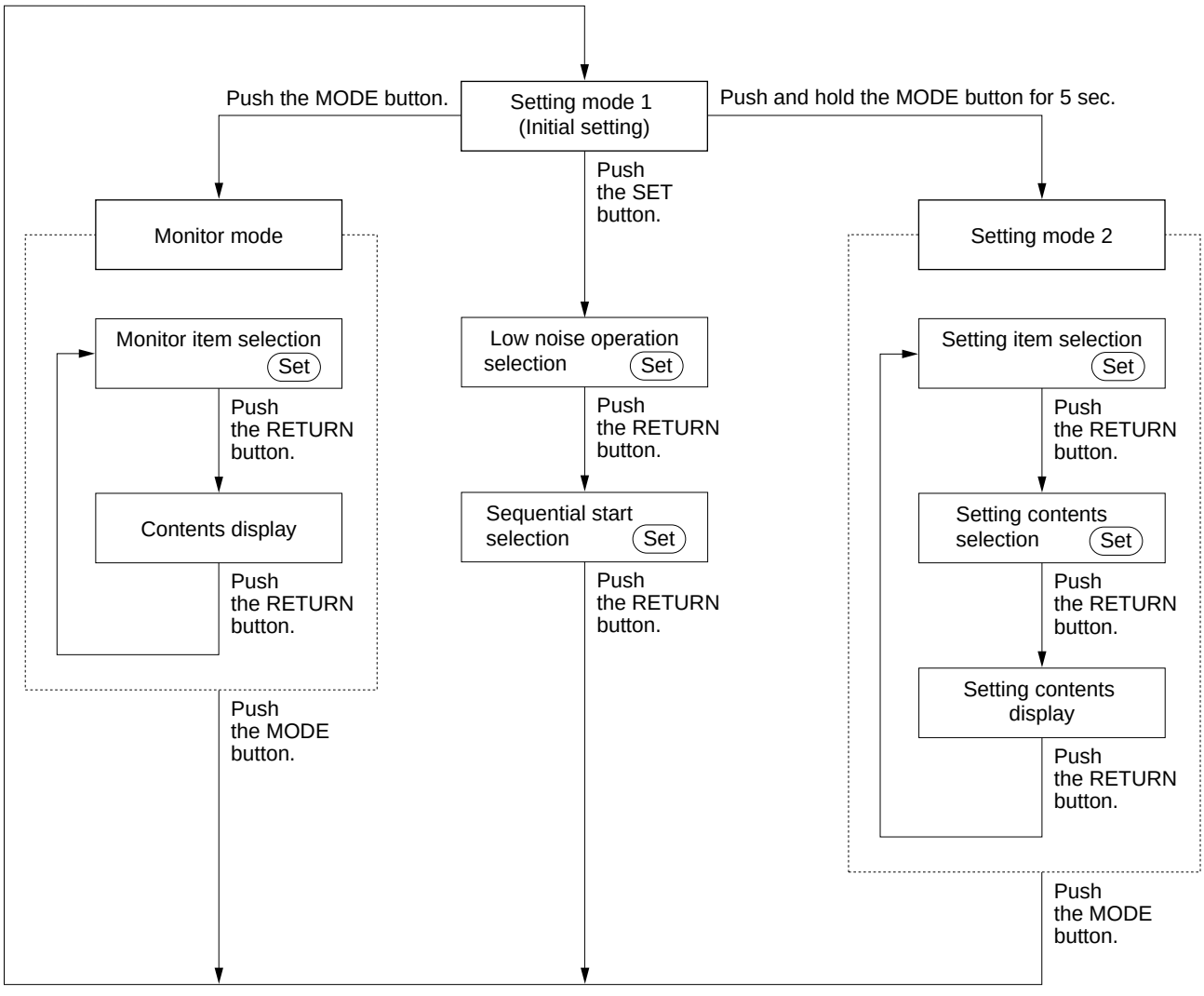
1.5 Setting Modes (ME1 Series)

The three setting modes are as follows:

- ◆ **Setting mode 1** ..... Mode for selecting cool/heat setting method, and whether or not to use low noise operation and sequential start.
  (H1P off)
- ◆ **Setting mode 2** ..... Mode for changing operating status and setting addresses; used primarily for service.
  (H1P on)
- ◆ **Monitor mode** ..... Mode for checking setting made in the setting modes, number of connected units, etc.
  (H1P flickers)

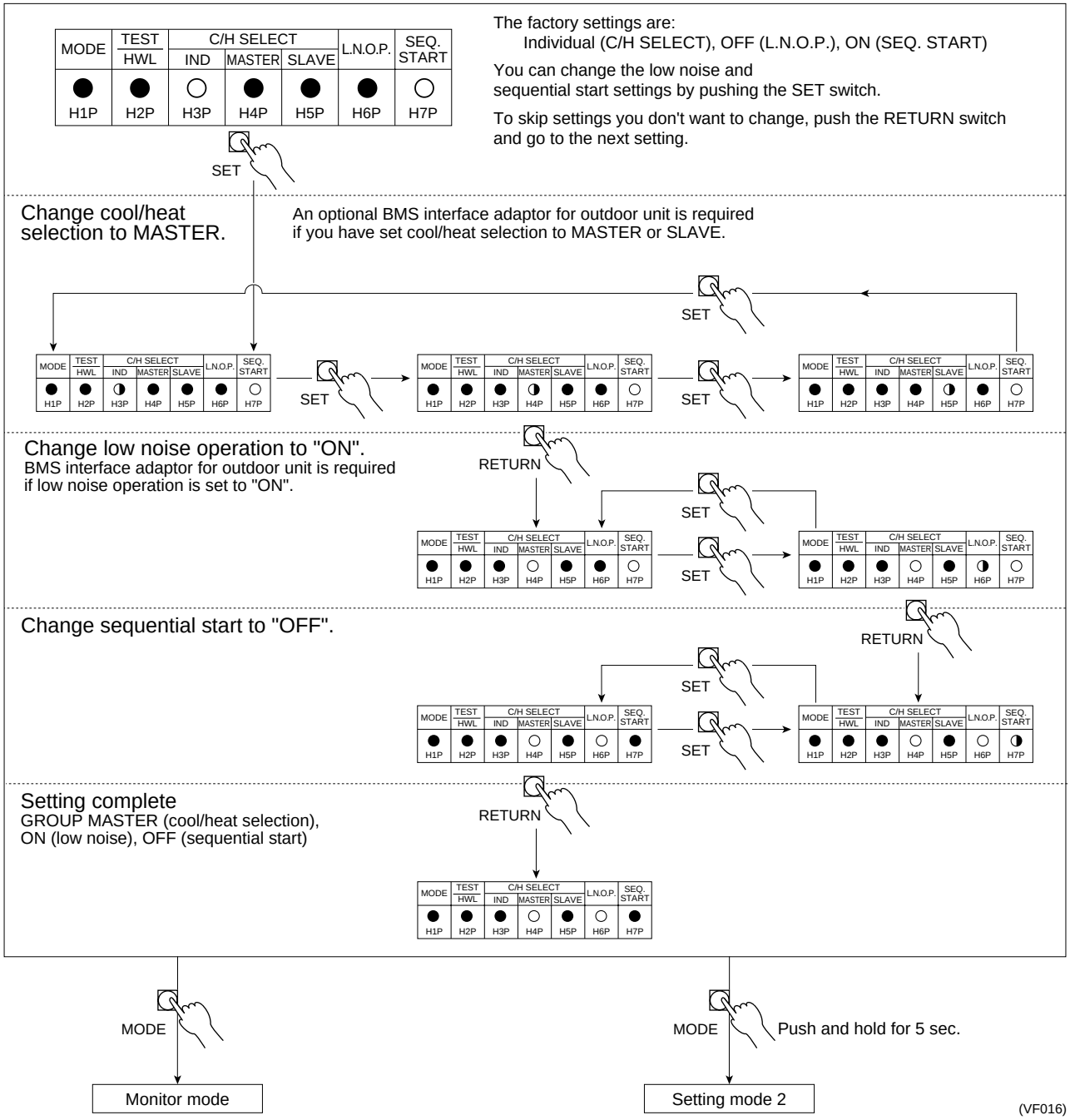
Mode Changing Procedure

The flow of the setting modes is as follows. (See the following pages for details.)



- ■ You can make your selections with the SET button (Set) .
- ■ **If you become unsure of how to proceed, push the MODE button and return to setting mode 1.**
- ■ You don't have to perform power supply reset after changing settings in setting mode 1 (including [SS1] cool/heat selection switch on the outdoor unit PC board) and setting mode 2.

1.5.1 Setting Mode 1


MODE
TEST
HWL
C/H SELECT
IND
MASTER
SLAVE
L.N.O.P.
SEQ. START
H1P
H2P
H3P
H4P
H5P
H6P
H7P
SET
The factory settings are:
Individual (C/H SELECT), OFF (L.N.O.P.), ON (SEQ. START)
You can change the low noise and sequential start settings by pushing the SET switch.
To skip settings you don't want to change, push the RETURN switch and go to the next setting.
Change cool/heat selection to MASTER.
An optional BMS interface adaptor for outdoor unit is required if you have set cool/heat selection to MASTER or SLAVE.
Change low noise operation to "ON".
BMS interface adaptor for outdoor unit is required if low noise operation is set to "ON".
RETURN
Change sequential start to "OFF".
Setting complete
GROUP MASTER (cool/heat selection), ON (low noise), OFF (sequential start)
MODE
Monitor mode
Push and hold for 5 sec.
Setting mode 2
(VF016)

1.5.2 Setting Mode 2

To enter setting mode 2 from setting mode 1 (normal), you must push and hold the MODE button (BS1) for 5 seconds. (Setting mode 2 cannot be entered while still making settings in setting mode 1.)

Setting procedure

1. Push the SET button and match with the setting item (LED display). (All 9 settings)
↓
2. Push the RETURN button (BS3) and the present settings flicker (LED display).
↓
3. Push the SET button (BS2) and match with each setting (LED flicker display).
↓
4. Push the RETURN button (BS3) and enter the settings.
↓
5. Push the RETURN button (BS3) and return to the initial status.

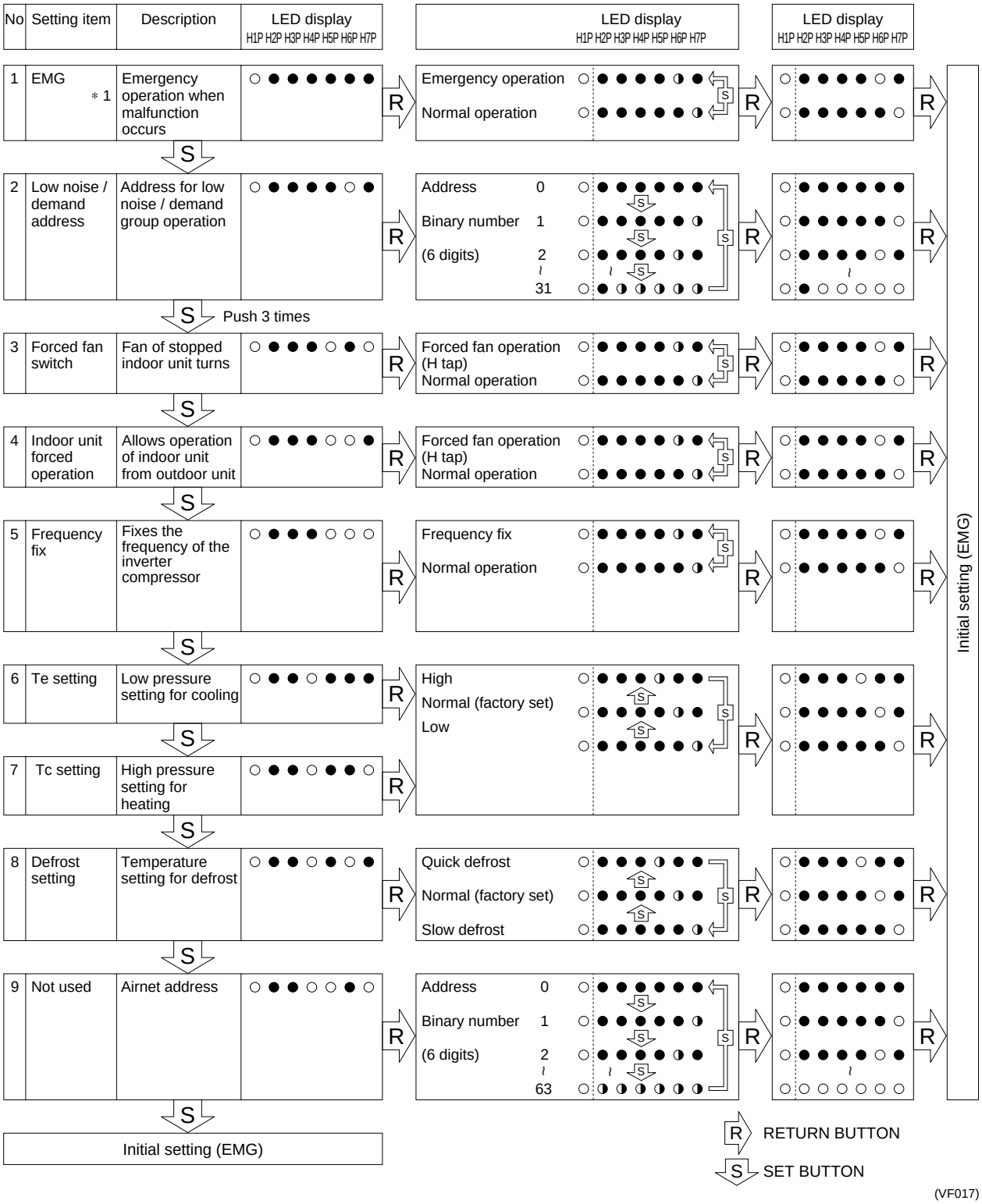
Note:
- If you become unsure of how to proceed, push the MODE button (BS1) and return to setting mode 1.
- The initial status of setting mode 2 is the status of setting item No. 1 in mode 2.

Setting items

	Setting item	Description	LED display H1P H2P H3P H4P H5P H6P H7P		LED display H1P H2P H3P H4P H5P H6P H7P
1	EMG ＊1	Emergency operation when malfunction occurs	○ ● ● ● ● ● ●	Emergency operation (Runs only by standard compressor) Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
2	Low noise / demand address	Address for low noise / demand group operation	○ ● ● ● ● ○ ●	Address 0 Binary number 1 (6 digits) 2 〃 31	○ ● ● ● ● ● ● ○ ● ● ● ● ● ○ ○ ● ● ● ● ○ ● 〃 〃 ○ ● ○ ○ ○ ○ ○
3	Forced fan switch	Fan of stopped indoor unit turns	○ ● ● ● ○ ● ○	Forced fan operation (H tap) Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
4	Indoor unit forced operation	Allows operation of indoor unit from outdoor unit	○ ● ● ● ○ ○ ●	Indoor unit forced operation Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
5	Frequency fix	Fixes the frequency of the inverter compressor 5HP…68Hz 8.10HP‥86Hz+ON	○ ● ● ● ○ ○ ○	Frequency fix Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
6	Te setting	Low pressure setting for cooling	○ ● ● ○ ● ● ●	High Normal (factory set) Low	○ ● ● ● ○ ● ● ○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
7	Tc setting	High pressure setting for heating	○ ● ● ○ ● ● ○		
8	Defrost setting	Temperature setting for defrost	○ ● ● ○ ● ○ ●	Quick defrost Normal (factory set) Slow defrost	○ ● ● ● ○ ● ● ○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
9	Not used	Airnet address	○ ● ● ○ ○ ● ○	Address 0 Binary number 1 (6 digits) 2 〃 63	○ ● ● ● ● ● ● ○ ● ● ● ● ● ○ ○ ● ● ● ● ○ ● 〃 〃 ○ ○ ○ ○ ○ ○ ○

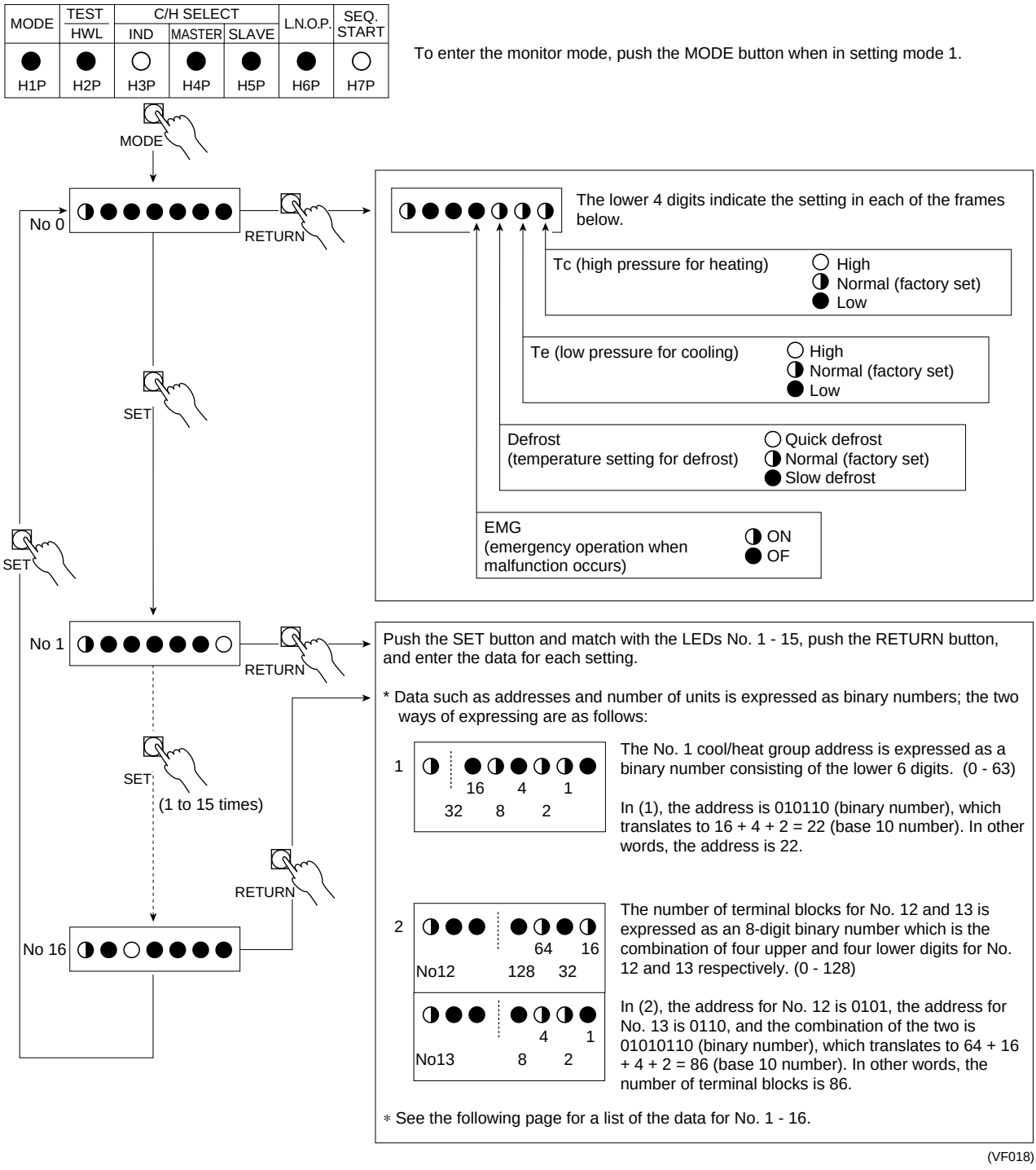
(VF084)

Note: ＊1 : Simultaneous cooling / heating operation is not possible by Emergency operation.



Note: ＊1 : Simultaneous cooling / heating operation is not possible by Emergency operation.

1.5.3 Monitor Mode


MODE
TEST
HWL
C/H SELECT
IND
MASTER
SLAVE
L.N.O.P.
SEQ. START
H1P
H2P
H3P
H4P
H5P
H6P
H7P
To enter the monitor mode, push the MODE button when in setting mode 1.
MODE
No 0
RETURN
SET
SET
No 1
RETURN
SET
(1 to 15 times)
RETURN
No 16
The lower 4 digits indicate the setting in each of the frames below.
Tc (high pressure for heating)
High
Normal (factory set)
Low
Te (low pressure for cooling)
High
Normal (factory set)
Low
Defrost
(temperature setting for defrost)
Quick defrost
Normal (factory set)
Slow defrost
EMG
(emergency operation when malfunction occurs)
ON
OF
Push the SET button and match with the LEDs No. 1 - 15, push the RETURN button, and enter the data for each setting.
* Data such as addresses and number of units is expressed as binary numbers; the two ways of expressing are as follows:
1
16 4 1
32 8 2
The No. 1 cool/heat group address is expressed as a binary number consisting of the lower 6 digits. (0 - 63)
In (1), the address is 010110 (binary number), which translates to 16 + 4 + 2 = 22 (base 10 number). In other words, the address is 22.
2
64 16
No12 128 32
4 1
No13 8 2
The number of terminal blocks for No. 12 and 13 is expressed as an 8-digit binary number which is the combination of four upper and four lower digits for No. 12 and 13 respectively. (0 - 128)
In (2), the address for No. 12 is 0101, the address for No. 13 is 0110, and the combination of the two is 01010110 (binary number), which translates to 64 + 16 + 4 + 2 = 86 (base 10 number). In other words, the number of terminal blocks is 86.
* See the following page for a list of the data for No. 1 - 16.

(VF018)

- After making sure the data is correct, push the RETURN button and return to No. 0, or push the MODE button and return to setting mode 1.

Monitor Mode Data

Mode No.	LED	Data	Display method	Size (binary number)
No 1	○●●●○●	Low noise / demand address	0 ~ 31	Lower 6 digits
No 2	○●●●○○	Not used		
No 3	○●●●○●●	Not used	0 ~ 63	Lower 6 digits
No 4	○●●●○●○	Number of connected units	0 ~ 63 units	Lower 6 digits
No 5	○●●●○○●	Number of connected HR boxes	0 ~ 63 units	Lower 6 digits
No 6	○●●●○○○	Number of connected zone units (excluding outdoor and HR boxes)	0 ~ 63 units	Lower 6 digits
No 7	○●●○●●●	Number of outdoor units	0 ~ 63 units	Lower 6 digits
No 8	○●●○●●○	Number of HR boxes	0 ~ 128 units	Lower 4 digits, upper
No 9	○●●○●○●	Number of HR boxes	0 ~ 128 units	Lower 4 digits, lower
No 10	○●●○●○○	Number of zone units (excluding outdoor and HR boxes)	0 ~ 63 units	Lower 6 digits
No 11	○●●○○●●	Number of terminal blocks	0 ~ 128 units	Lower 4 digits, upper
No 12	○●●○○●○	Number of terminal blocks	0 ~ 128 units	Lower 4 digits, lower
No 13	○●●○○○●	Not used		
No 14	○●●○○○○	Not used		
No 15	○●○●●●●	Not used		

1.6 Sequential Start

Separates the start timing for standard compressors by three seconds each in order to prevent over-current when several compressors are to be started simultaneously.
Sequential start is possible for up to three units wired as a group to a single power supply. You should however connect an outdoor unit of small capacity as the third unit in the sequence.

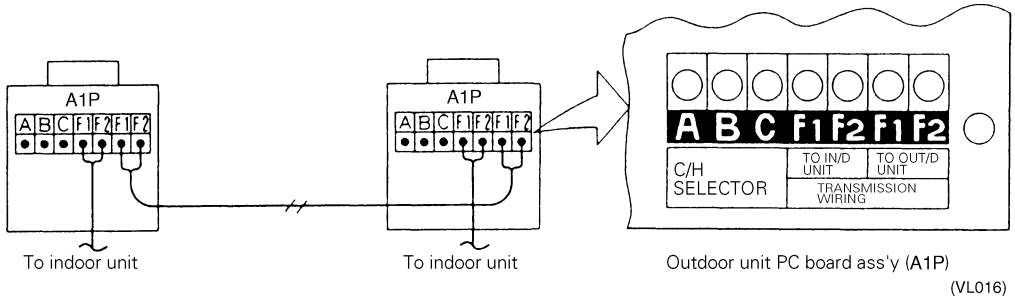
Method of Sequential Start

1. Power supply wiring

Must be wired as a group to the power supply.

2. Wiring

Connect transmission wiring to terminals F1 and F2 (outdoor - outdoor) on the outdoor unit PC board (A1P). Switch to the monitoring mode and see if sequential start has been selected. If not, switch to setting mode 1 and select sequential start. (Sequential start is factory set to “ON.”) For transmission wiring, use 0.75 - 1.25 mm² sheathed vinyl cord or double-core cable.



1.7 BMS Interface Adaptor for Outdoor Unit (MX1 Series)

Purpose / Application

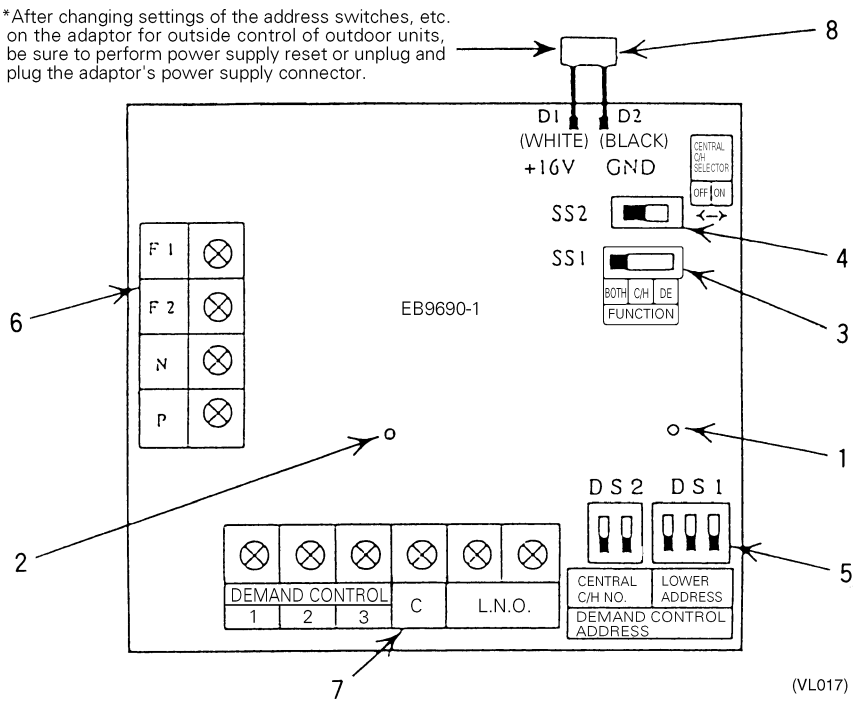
BMS interface adaptor for outdoor unit is required in order for the UM MX1 Series to carry out the types of control given below.

1. Group switching of cool/heat mode for more than one outdoor unit system. The adaptor is required for cool/heat selection by indoor unit remote controller, by cool/heat selector, or by cool/heat central remote controller.
2. Low noise control
3. Demand control

Installation Position

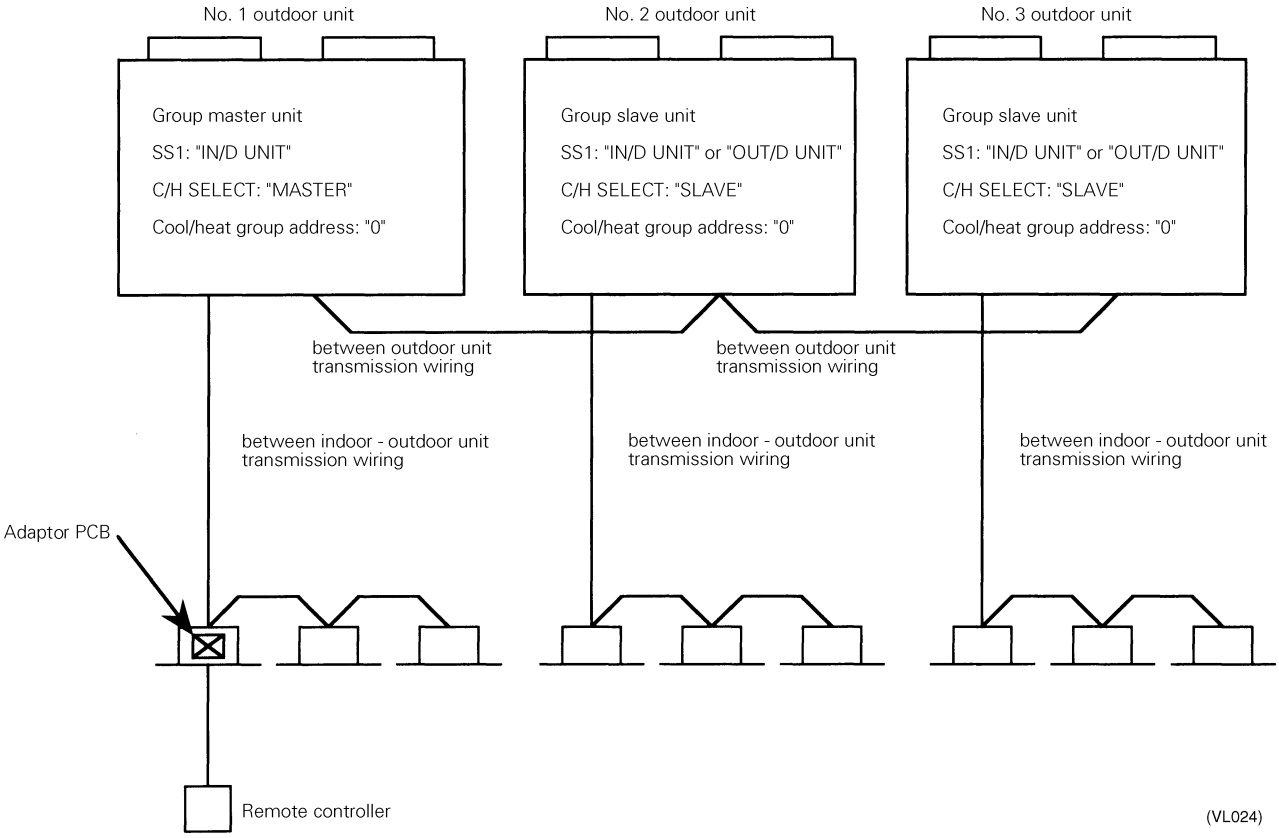
The adaptor can be installed inside any indoor unit or HR box connected to a UM net.

Part Names and Functions



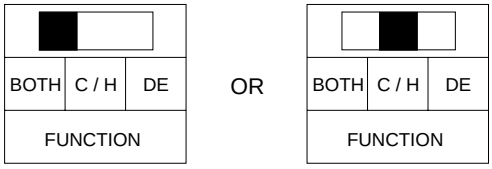
1	SERVICE MONITOR [HAP] (Green)	Normal: Flicker Malfunction: On or off	LED display ○ : On ◑ : Flicker ● : Off
2	SERVICE MONITOR [H01P] (Green)	When using cool/heat central remote controller: Normal: On Malfunction: Off (If not using cool/heat central remote controller, LED remains off.	
3	Function switch [SS1] (Factory set: BOTH)	Sets whether the address setting switch will set cool/heat address, demand / low noise address, or both. Left (BOTH) Middle (C / H) Right (DE·LOW NOISE) (VL018)	
4	Cool/heat central remote controller selection switch [SS2] (Factory set: No)	Sets whether cool/heat central remote controller is connected or not. Left (Not connected) Right (Connected) (VL019)	
5	Address setting switch DS2 / DS1] (Factory set: 0)	Sets cool/heat address or demand address.	Upper 2 bits (ON) (1) Lower 3 bits (OFF) (0) (VL020) (The black part represents the switch.)
6	Terminal block for transmission (F1 / F2) (N / P)	F1 / F2 : Wiring connection with terminals F1 and F2 of outdoor unit, etc. N / P : Wiring connection with terminals N and P of cool/heat central remote controller.	
7	Demand / low noise input terminal block (X1M)	Connects control input from remote source (host computer monitor panel, demand controller, timer, etc.).	
8	Power supply connector (D1 / D2)	Connects "power supply connector for adaptor for outside control of outdoor units" of indoor unit or BS unit, etc.	

System Examples Group selection of cool/heat mode by indoor unit remote controller

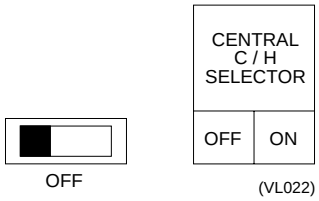

No. 1 outdoor unit
No. 2 outdoor unit
No. 3 outdoor unit
Group master unit
SS1: "IN/D UNIT"
C/H SELECT: "MASTER"
Cool/heat group address: "0"
Group slave unit
SS1: "IN/D UNIT" or "OUT/D UNIT"
C/H SELECT: "SLAVE"
Cool/heat group address: "0"
Group slave unit
SS1: "IN/D UNIT" or "OUT/D UNIT"
C/H SELECT: "SLAVE"
Cool/heat group address: "0"
between outdoor unit transmission wiring
between outdoor unit transmission wiring
between indoor - outdoor unit transmission wiring
between indoor - outdoor unit transmission wiring
between indoor - outdoor unit transmission wiring
Adaptor PCB
Remote controller
(VL024)

Switch Settings on the Adaptor PCB

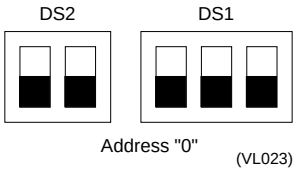
■ SS1



■ SS2



■ DS1 / DS2



Outdoor Unit PCB Settings

■ Group master unit
SS1: “IN/D UNIT”
Setting mode 1
C / H SELECT : “MASTER”
Setting mode 2
Cool/heat group address: “0”
Combines DS1 and DS2 of PC board adaptor.

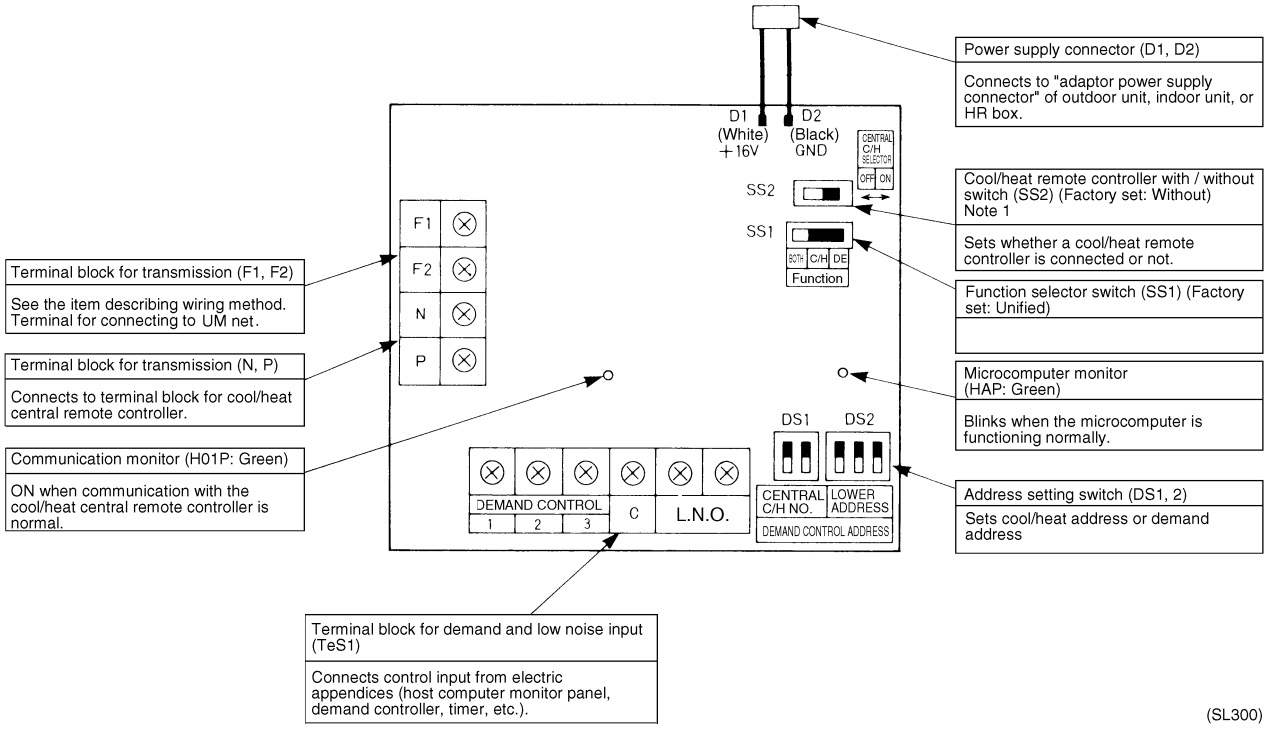
■ Group slave unit
SS1: “IN/D UNIT” or “OUT/D UNIT”
Setting mode 1
C / H SELECT : “SLAVE”
Setting mode 2
Cool/heat group address: “0”
Combines DS1 and DS2 of adaptor PCB.

1.8 BMS Interface Adaptor for Outdoor Unit (ME1 Series)

<Objective/use>

By adding an BMS interface adaptor for outdoor unit to HR boxes or indoor units connected in a UM net, you can simultaneously select cool/heat mode for several outdoor units in the system, and it enables demand control and low noise control.

Part names and functions

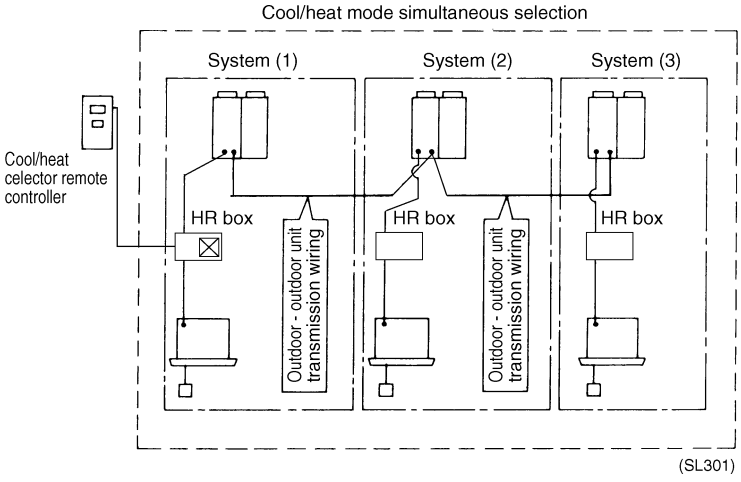

Power supply connector (D1, D2)
Connects to "adaptor power supply connector" of outdoor unit, indoor unit, or HR box.
D1 (White) +16V
D2 (Black) GND
CENTRAL C/H SELECTOR
OFF ON
SS2
Cool/heat remote controller with / without switch (SS2) (Factory set: Without) Note 1
SS1
BOTH C/H DE
Function
Sets whether a cool/heat remote controller is connected or not.
Function selector switch (SS1) (Factory set: Unified)
Terminal block for transmission (F1, F2)
See the item describing wiring method. Terminal for connecting to UM net.
F1
F2
N
P
Terminal block for transmission (N, P)
Connects to terminal block for cool/heat central remote controller.
Communication monitor (H01P: Green)
ON when communication with the cool/heat central remote controller is normal.
Microcomputer monitor (HAP: Green)
Blinks when the microcomputer is functioning normally.
DS1
DS2
DEMAND CONTROL
1 2 3
C
L.N.O.
CENTRAL C/H NO.
LOWER ADDRESS
DEMAND CONTROL ADDRESS
Address setting switch (DS1, 2)
Sets cool/heat address or demand address
Terminal block for demand and low noise input (TeS1)
Connects control input from electric appendices (host computer monitor panel, demand controller, timer, etc.).
(SL300)

Note 1. SS2 is not applicable to cooling only system.

1.8.1 Cool/heat mode unified selection

(For detailed example of wiring, see the page describing cool/heat mode control.)

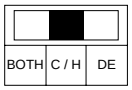
<System outline>



<Settings of switches on the PC board adaptor>

■SS1

("BOTH" is selected when demand control is carried out at the same time.)



C / H

(SL302)

■SS2

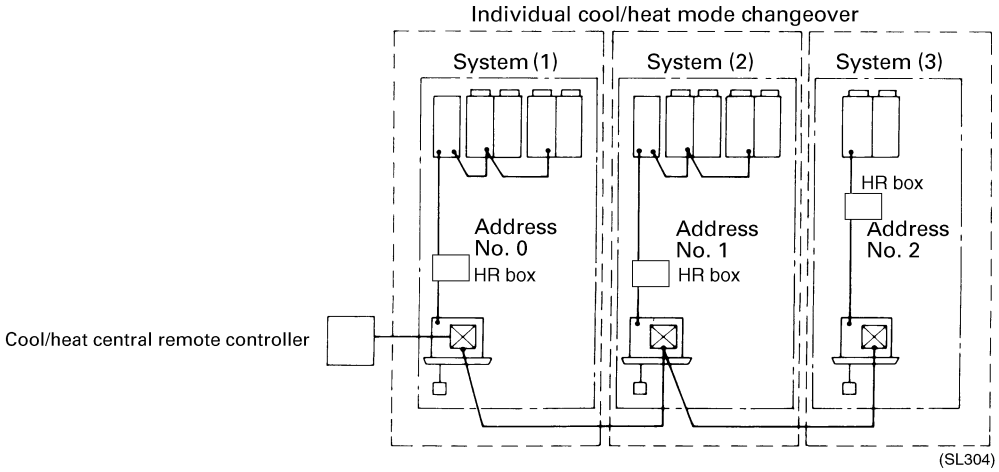
OFF

(SL303)

■DS1·2

BMS interface adaptor for outdoor unit

<Changeover by cool/heat central remote controller>

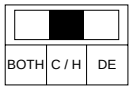


(SL304)

<Switch settings on adaptor printed circuit board>

■SS1

(When demand control is used together, set the switch to "BOTH")



Cool

(SL305)

■SS2

ON

(SL306)

■DS1·2 For individual control, do not use the same address twice.

1.8.2 Demand / low noise control

Connecting control input to the BMS interface adaptor for outdoor unit enables demand and low noise control.

■ **Demand control (figures indicate demand rate)**

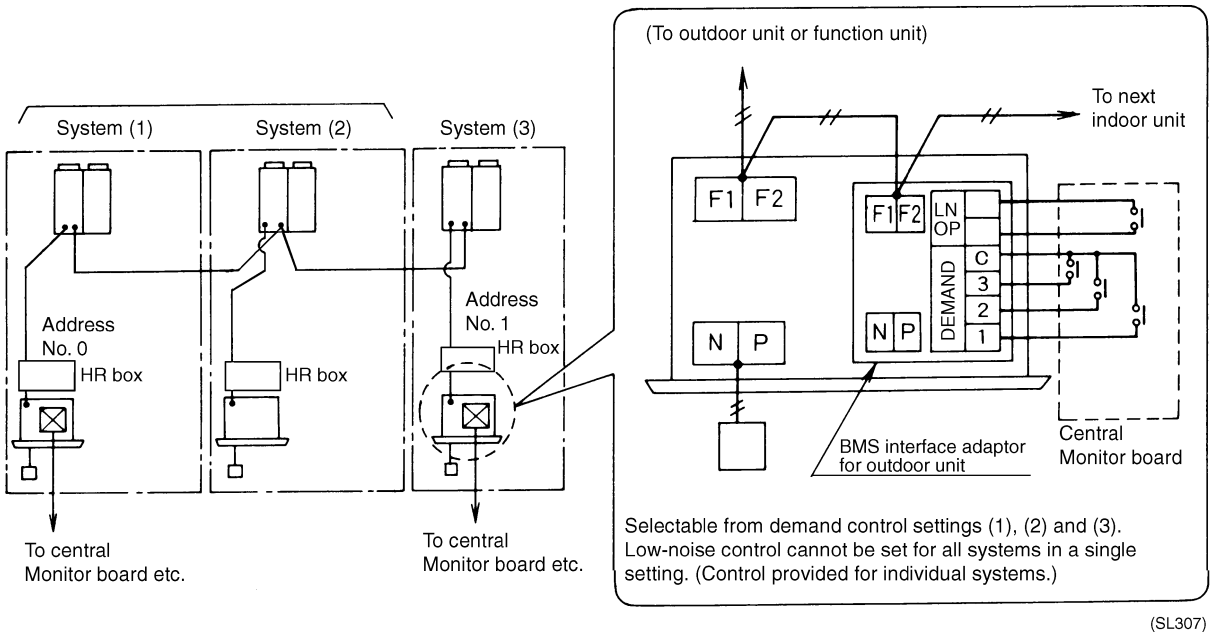
When short circuit between (1) and (C): Approx. 70% as a guideline
When short circuit between (2) and (C): Approx. 40% as a guideline
When short circuit between (3) and (C): Forced fan operation

■ **Low noise control (Outdoor unit)**

Running noise can be reduced by 2~ 3dB by controlling capacity of outdoor unit.

<System general>

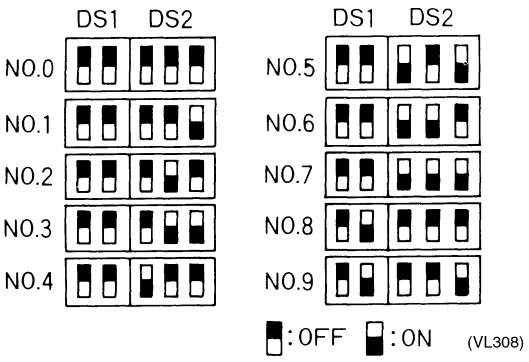
When each system is set to the same address, the same demand control operation is conducted.



<Common>

<Address setting (DS1 / DS2)>

Decide the address for each control unit from 0~9 and set.



Notes:

- Setting is within 8 groups when using a cool/heat central remote controller. Set from No. 0~No. 7.
- Be sure to make the address No. of the PC board adaptor described above match the address No. of function unit or outdoor unit (HR box if using cool/heat simultaneous selection type). (For detailed settings, see the installation instruction.)

<Control input specifications>

- **Input signal**

  Constant contact a

  Input current is approx. 12 - 24 VDC, 10 mA per contact.

  Use a micro-current contact for the relay contact.

  (Max. 12 VDC, 1 mA)

- **Outside wiring specifications**

  Recommended electric wiring: Sheathed vinyl cord or cable 0.75~1.25 mm² (double core)

  Wiring length: Max. 150 m

  Run separate from power line in order to prevent malfunction.

- **Installation positions**

	Model/series	Installation box/plate	Installation position
Outdoor unit	Function unit	Not necessary	Inside main unit's electric box
Indoor unit	CS-UM	KRP1B98	∗ Regarding installation position, see the page describing the remote group control adaptor
	CS-LM	KRP1B96	
	CS-DM CS-FM CS-EM	Not necessary	
	CS-TM	KRP1B93	
	CS-KM	Not necessary	
	CS-PM / CS-RM		
	CZ-HR	Not necessary	Inside main unit's electric box

1.9 Cool / Heat Mode Selection (MX1 Series)

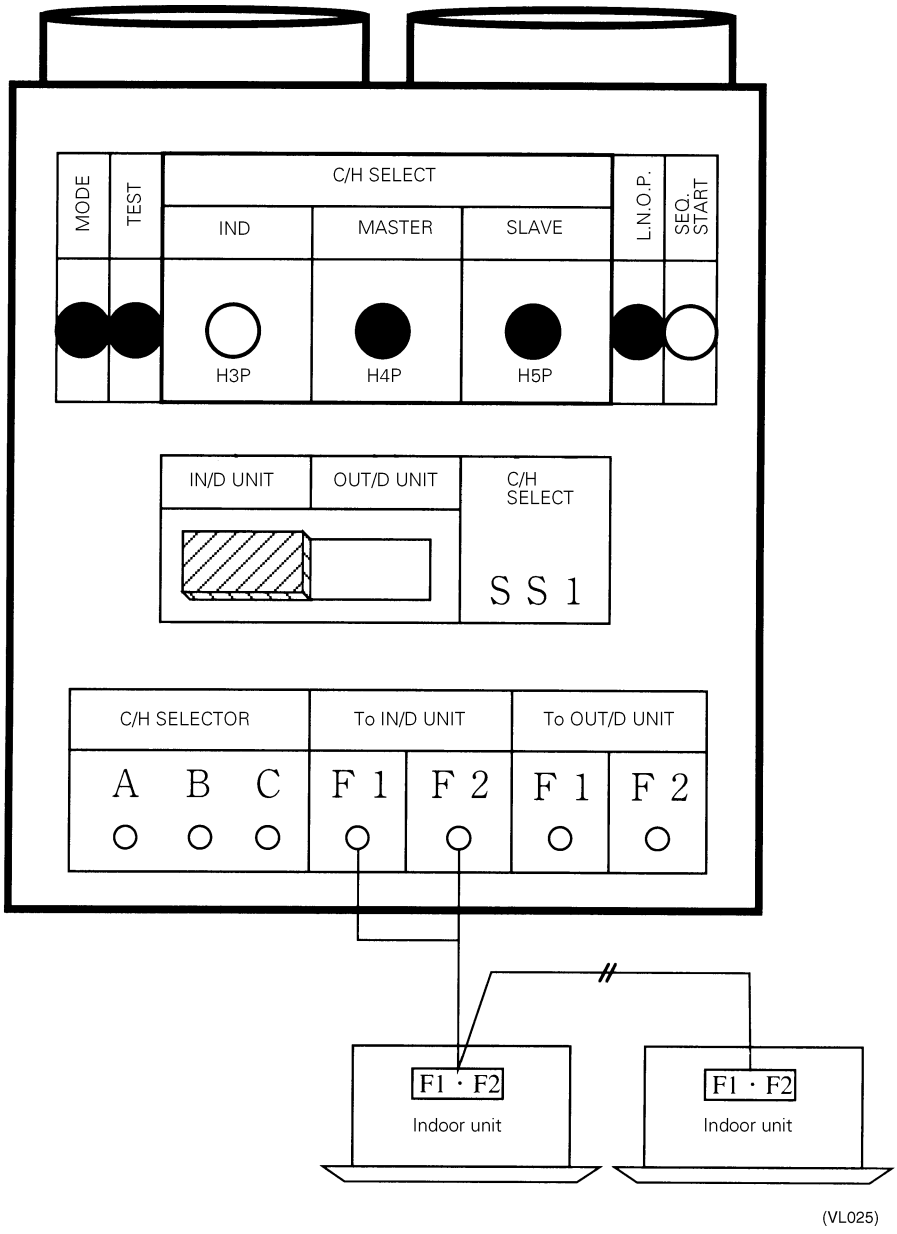
The UM MX1 Series offers the following four cool/heat mode selections.

1. Setting of cool/heat by individual outdoor unit system by indoor unit remote controller
2. Setting of cool/heat by individual outdoor unit system by cool/heat selector
3. Setting of cool/heat by outdoor unit system group in accordance with group master outdoor unit by indoor unit remote controller
4. Setting of cool/heat by outdoor unit system group in accordance with group master outdoor unit by cool/heat selector

Each of these setting methods is explained in detail below.
(For **3** and **4** be sure to perform power supply reset after changing settings.)

1.9.1 Setting of Cool / Heat by Individual Outdoor Unit System by Indoor Unit Remote Controller

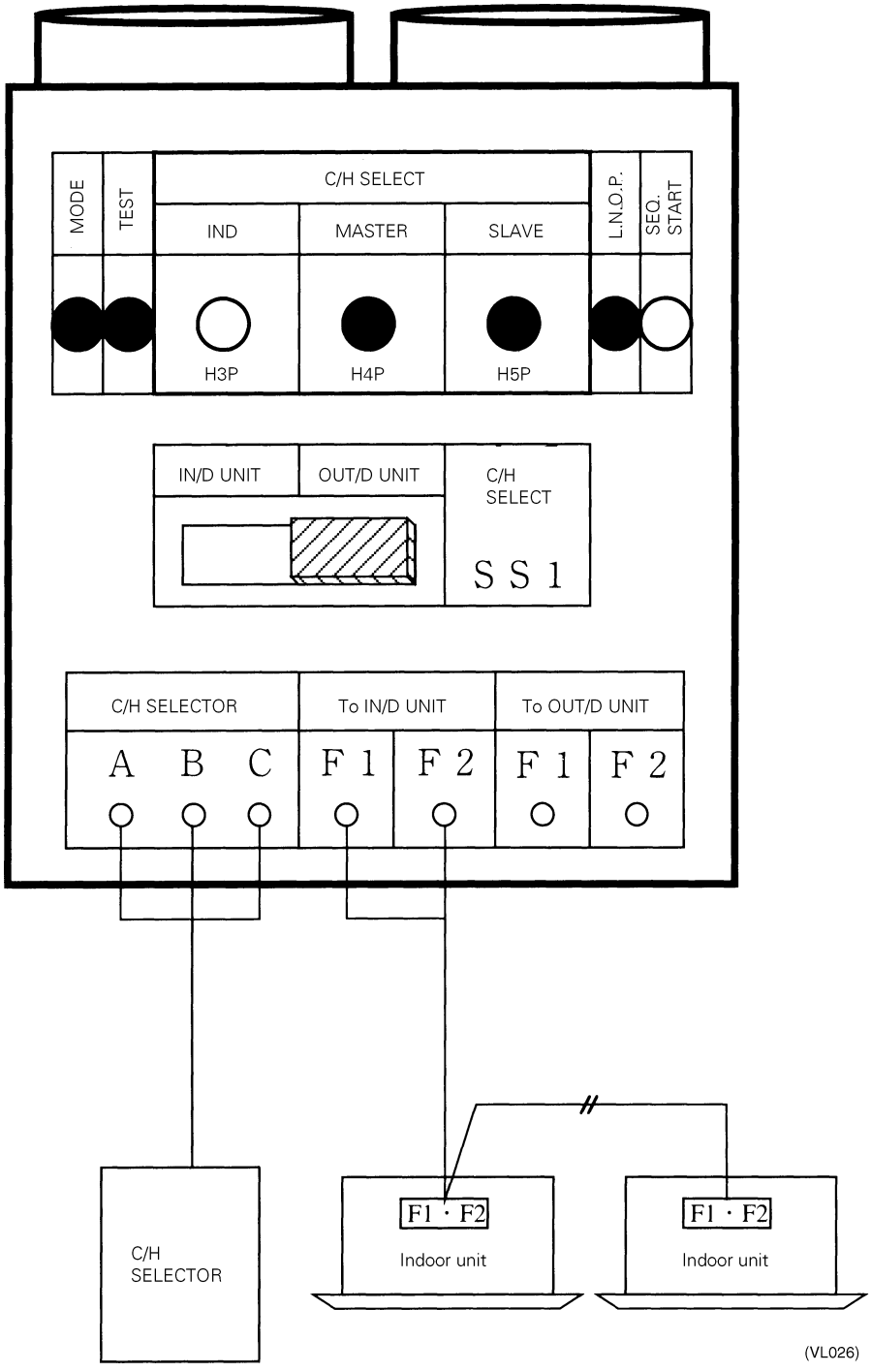
- Doesn't matter whether or not there is outdoor - outdoor unit wiring.
- Set SS1 of the outdoor unit PCB to "IN / D UNIT" (factory set).
- In setting mode 1, set cool/heat selection to "IND" (factory set).



(VL025)

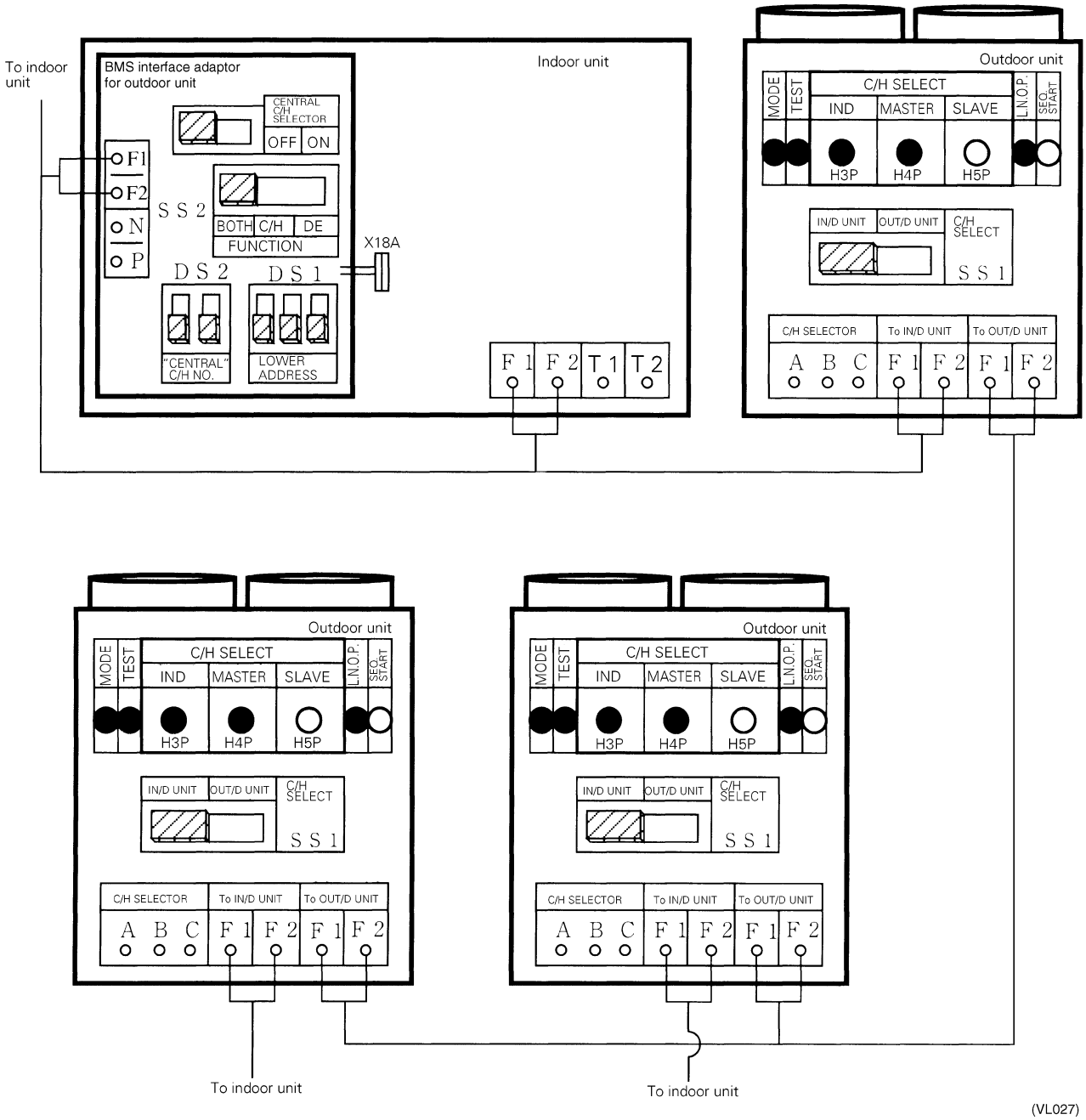
1.9.2 Setting of Cool / Heat by Individual Outdoor Unit System by Cool/Heat Selector

- Doesn't matter whether or not there is outdoor - outdoor unit wiring.
- Set SS1 of the outdoor unit PC board to "OUT / D UNIT."
- In setting mode 1, set cool/heat selection to "IND" (factory set).



1.9.3 Setting of Cool / Heat by Outdoor Unit System Group in Accordance with Group Master Outdoor Unit by Indoor Unit Remote Controller

- Install the BMS interface adaptor for outdoor unit on either the outdoor - outdoor, indoor - outdoor, or indoor - indoor transmission line.
- Set SS1 of the outdoor unit PCB to “IN / D UNIT” (factory set).
- In setting mode 1, set the outdoor unit you want to give cool/heat selection permission to as the group master, and set the other outdoor units as group slave units.
- Set SS1 of the BMS interface adaptor for outdoor unit to “BOTH” (factory set) or “C / H.” Set SS2 to “OFF” (factory set).



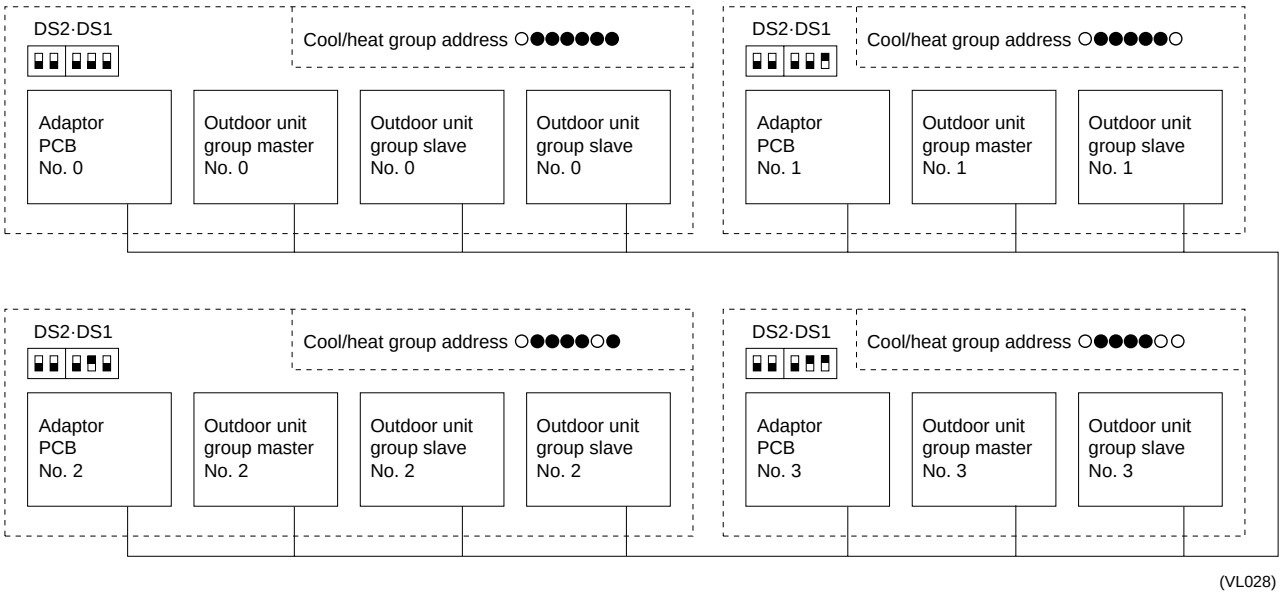
1.9.4 Setting of Cool / Heat by Outdoor Unit System Group in Accordance with Group Master Outdoor Unit by Cool/Heat Selector

- In addition to **1.9.3**, change the following:
- Install a cool / heat selector to the group master outdoor unit.
- Set SS1 of the group master outdoor unit’s PCB to “OUT / D UNIT.”

Supplement

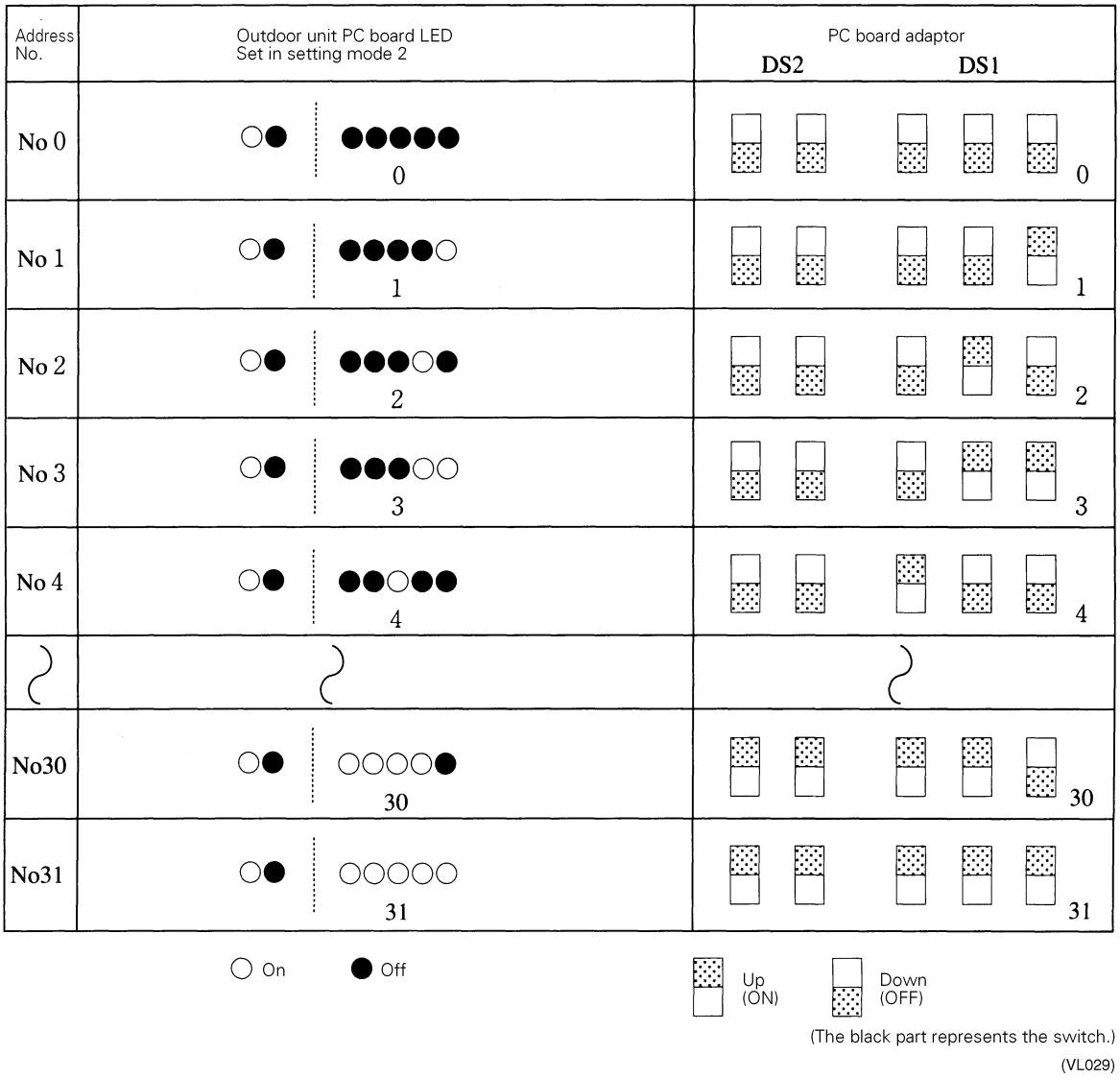
■ Supplement to **1.9.3** and **1.9.4**

If using several adaptor PCB and you want to select cool/heat mode for each adaptor PCB, set DS1 / DS2 of the adaptor PCB and the cool/heat group address on the outside unit's PCB to the same setting in setting mode 2.


DS2·DS1
Cool/heat group address ○●●●●●●
Adaptor PCB No. 0
Outdoor unit group master No. 0
Outdoor unit group slave No. 0
Outdoor unit group slave No. 0
DS2·DS1
Cool/heat group address ○●●●●●○
Adaptor PCB No. 1
Outdoor unit group master No. 1
Outdoor unit group slave No. 1
DS2·DS1
Cool/heat group address ○●●●●○●
Adaptor PCB No. 2
Outdoor unit group master No. 2
Outdoor unit group slave No. 2
Outdoor unit group slave No. 2
DS2·DS1
Cool/heat group address ○●●●●○○
Adaptor PCB No. 3
Outdoor unit group master No. 3
Outdoor unit group slave No. 3

(VL028)

Setting Method **1.9.3** and **1.9.4** address setting method (combine lower 5 digits as binary number)

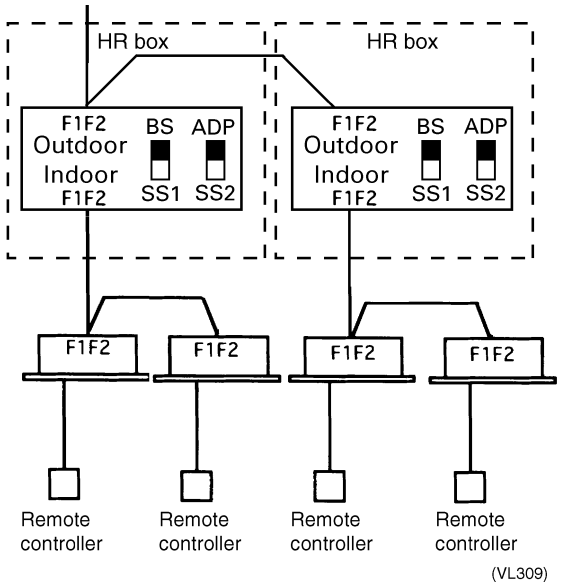


1.10 Cool / Heat Mode Switching (ME1 Series)

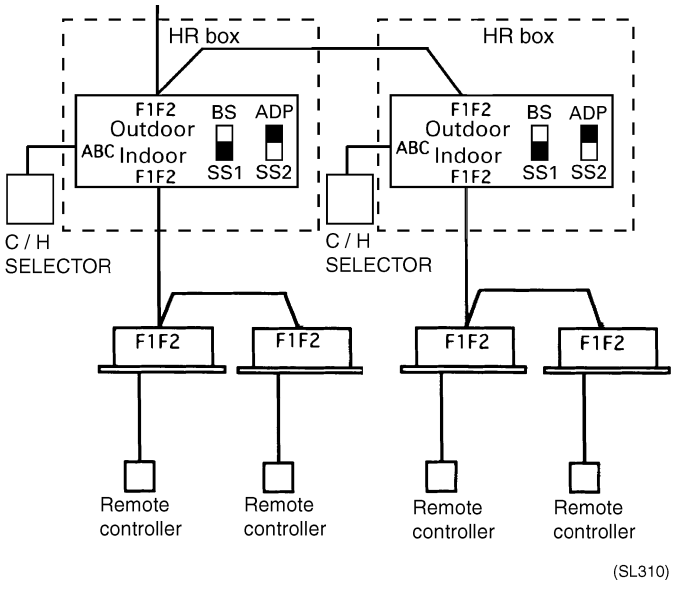
The UM “ME1 Series” heat recovery system offers the following 3 cool/heat modes.

1. Set cool/heat individually for all HR box systems using the indoor unit remote controller.
2. Set cool/heat individually for all HR box systems using the cool/heat select remote controller.
3. Set cool/heat individually for all HR box systems using the cool/heat central remote controller.

1.10.1 Set cool/heat individually for all HR box systems using the indoor unit remote controller.

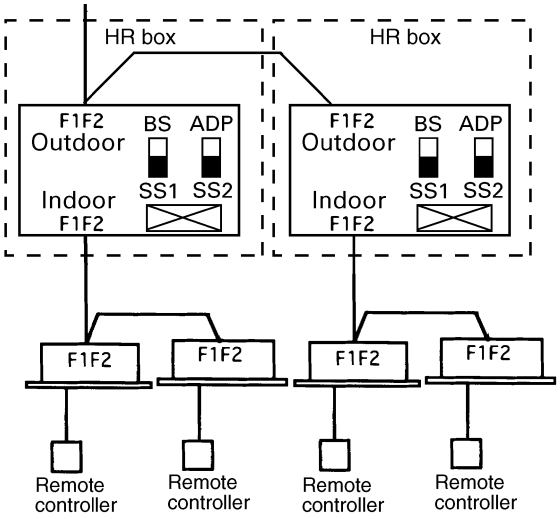


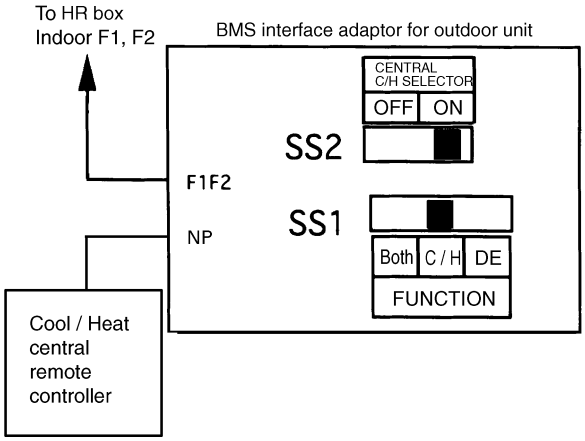
1.10.2 Set cool/heat individually for all HR box systems using the cool/heat select remote controller.



1.10.3 Set cool/heat individually for all HR box systems using the cool/heat central remote controller.

■ Install the "BMS interface adaptor for outdoor unit" in HR box.





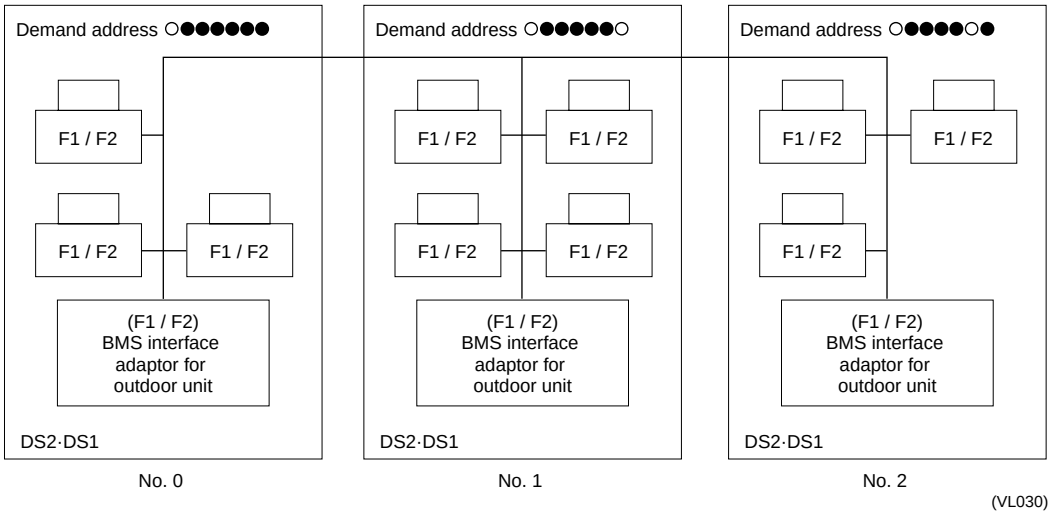
· DS 1 · DS 2 : Address setting
Address setting is not necessary

(SL311)

1.11 Low Noise / Demand Operation (MX1 Series)

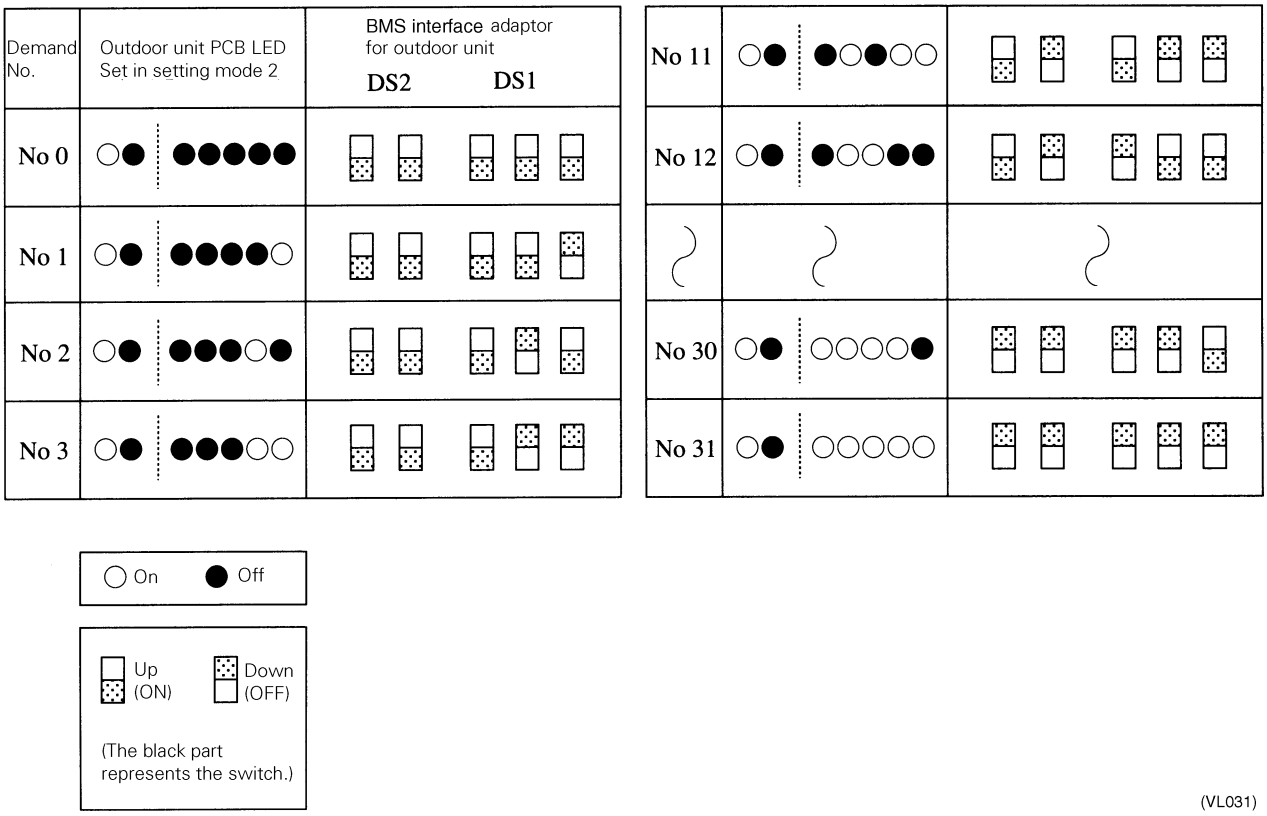
BMS interface adaptor for outdoor unit is required for each low noise and demand control zone.

- By using a separate BMS interface adaptor for outdoor unit and setting the outdoor unit address (setting mode 2) for each low noise and demand control zone, demand and low noise operation is carried out in accordance with contact input received from the adaptor in each zone.



(VL030)

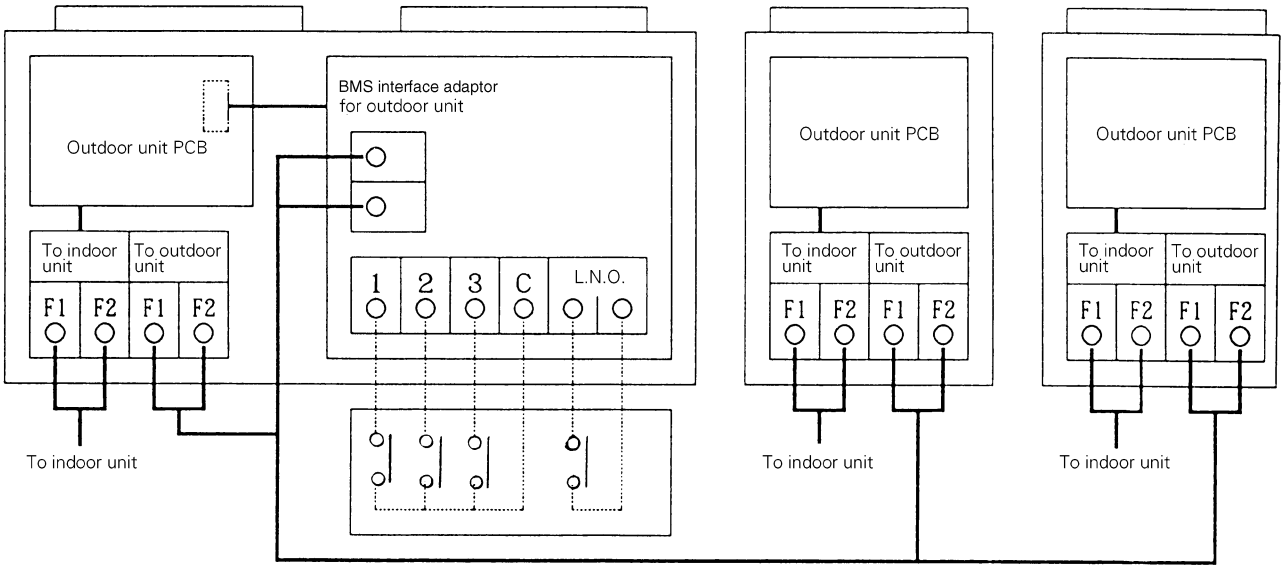
- Outdoor unit address setting (Setting mode 2; see page 69.)
- BMS interface adaptor for outdoor unit address setting
- ◆ Decide and set demand address 0 - 31 for each demand and low noise control zone. (See fig. below.)
- ◆ Set SS1 to “BOTH” (factory set) or “C / H.”



(VL031)

Wiring Method

Wire to the control box for the indoor unit or HR box. (Note: Differs according to the type of outside control adaptor.)



(VL032)

Demand / Low Noise Input

Short circuit between Demand 1 and C: Holds demand down to approx. 70%
Short circuit between Demand 2 and C: Holds demand down to approx. 40%
Short circuit between Demand 3 and C: Forced OFF by thermostat
L.N.O (jumper): Carries out low noise operation.

Input Signal

Input current by constant contact is about 10 mA per contact. Use a micro-current contact for the relay contact.

Exterior wiring specifications for demand and low noise operation
Recommended wiring:Sheathed vinyl cord or cable
Wiring length: 150 m
Keep away from power line in order to prevent malfunction.

1.12 Low Noise Operation (ME1 Series)

By connecting the external contact input to the low noise input of the BMS interface adaptor for outdoor unit (optional), you can save power and lower operating noise by 2 -3 dB.

1. Outdoor unit field setting

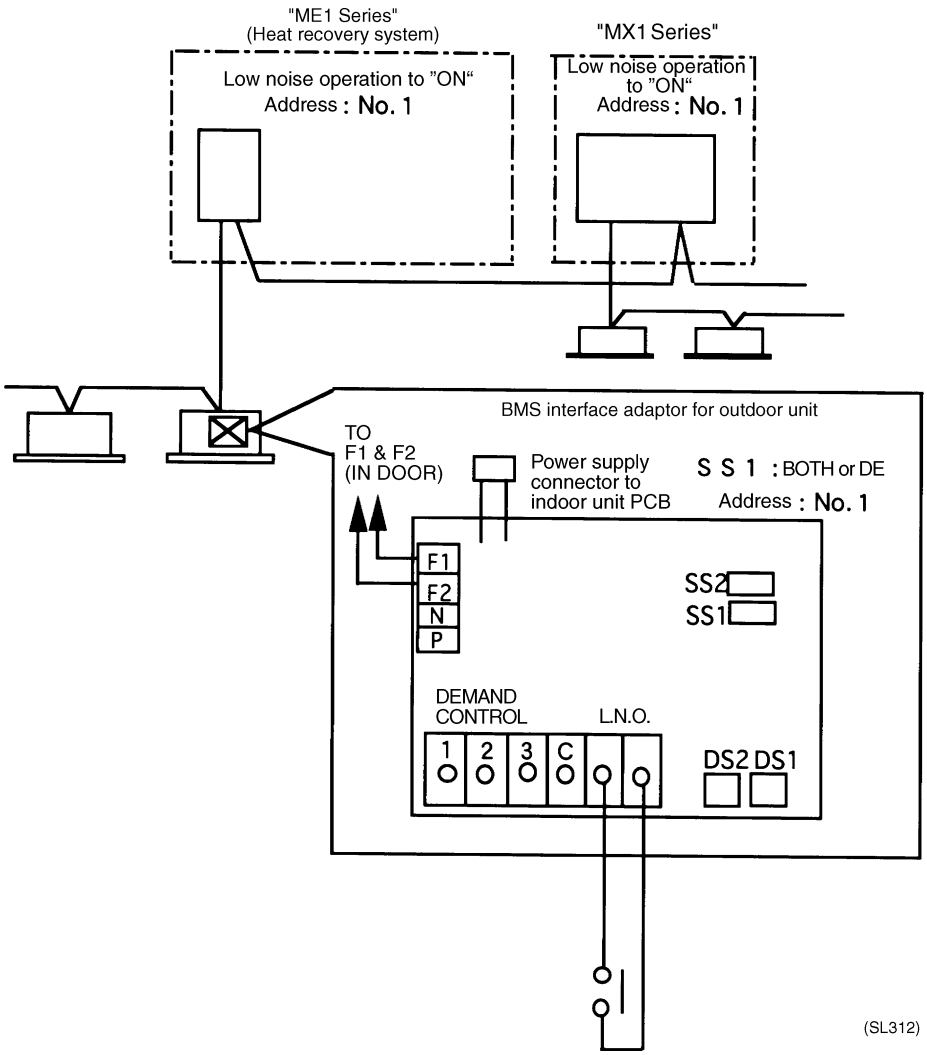
- Setting mode 1: Set low noise operation to “ON”.
- Setting mode 2: Match low noise operation and demand control address with address of BMS interface adaptor for outdoor unit.

2. BMS interface adaptor for outdoor unit setting

- Function switch (SS1)
  Set to “BOTH” or “DE.”
- Address setting switches (DS1, DS2)
  Match with outdoor unit low noise operation and demand control address.

3. Short-circuit the low noise input of BMS interface adaptor for outdoor unit.

Low noise control system example



1.13 Demand Control (ME1 Series)

By connecting the external contact input to the demand input of the BMS interface adaptor for outdoor unit (option), the compressor operating conditions can be controlled for reduced power consumption.

1. Demand 1 Approximately 70% level
2. Demand 2 Approximately 40% level
3. Demand 3 Forced thermostat OFF

1.13.1 Instructions for demand control operation

1. Outdoor unit field setting

■ Setting mode 1: Set low noise operation to “ON”.
Match low noise operation and demand control address with address of BMS interface adaptor for outdoor unit.

2. BMS interface adaptor for outdoor unit setting

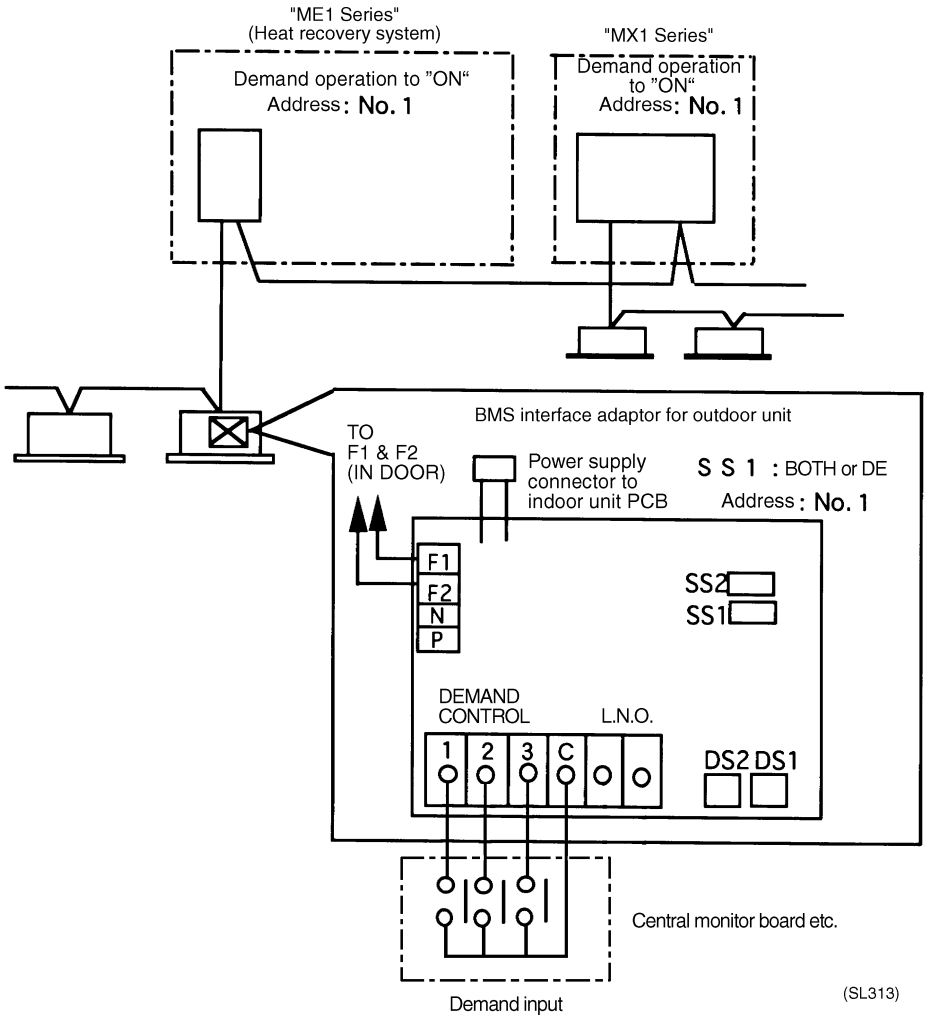
■ Function switch (SS1)
Set to “BOTH” or “DE.”

■ Address setting switches (DS1, DS2)
Match with outdoor unit low noise operation and demand control address.

3. Select one from demand input terminals 1 through 3 on the BMS interface adaptor for outdoor unit, and short the corresponding terminals.

1. Demand 1 Short 1-C.
2. Demand 2 Short 2-C.
3. Demand 3 Short 3-C.

Demand control system example

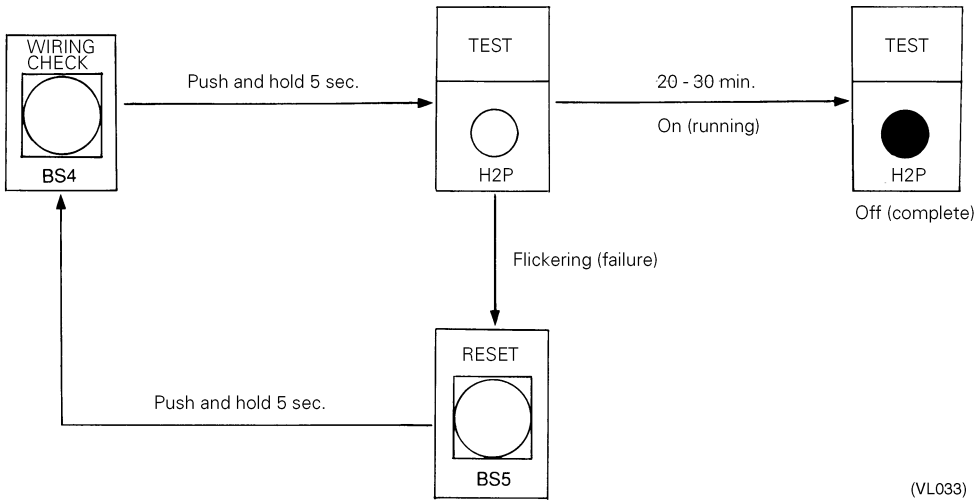


1.14 Wiring Check Operation

If within 12 hours of stopping cooling or heating, be sure to run all indoor units in the system you want to check in the fan mode for about 60 minutes in order to prevent mis-detection.

Operation Method

1. In the monitor mode, check the number of connected indoor units. (See monitor mode.)
2. Push and hold the WIRING CHECK button (BS4) for 5 seconds to perform wiring check operation. While running, TEST (H2P) lights and goes off when finished.
   If TEST (H2P) flickers (wiring check operation failure), push and hold the RESET button (BS5) for 5 seconds, and then repeat the procedure from the beginning.
3. About 1 minute after you finish running the system, once again check the number of connected indoor units in the monitor mode and make sure the number agrees with the first time you checked. If not, it indicates that there is a wiring mistake. Fix the wiring of the indoor unit whose remote controller displays “UF” when its ON/OFF switch is turned ON.

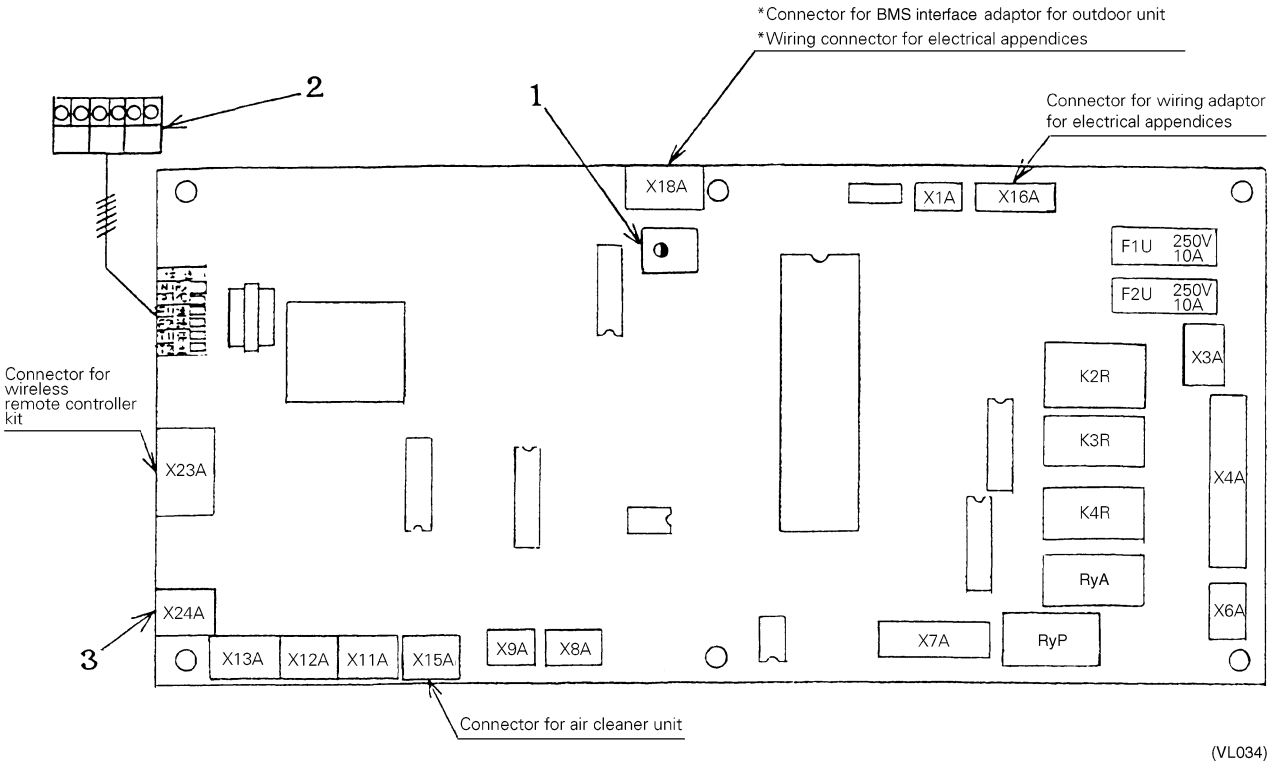


Note: Other settings are not accepted during wiring check operation.

1.15 Indoor Unit PCB Ass'y

The indoor unit PCB ass'y is equipped with terminals for control wiring and connectors for optional control accessories .
Group No. setting for central control and various operation setting switches, etc., are set by indoor unit remote controller.

2-way Cassette Type : CS-LM



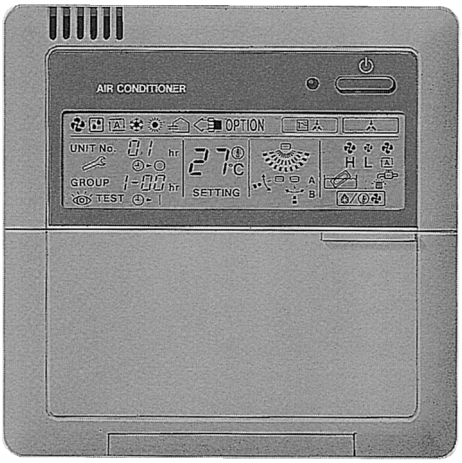
1 Service Monitor [HAP] (Green)	Lets you check the function status of the microcomputer. Normal : Flicker Malfunction : On or Off
2 Transmission wiring terminal	Terminal for remote controller wiring, indoor - outdoor unit transmission wiring (central wiring), and wiring for outside input
3 Connector for capacity setting adaptor	Connector for inserting the capacity setting adaptor for when replacing with auxiliary PC board. The adaptor is required for all models. * Fan phase control for CS-UM, CS-TM and CS-KM only.

Remote controller		Transmission wiring		Outside input	
P1	P2	F1	F2	T1	T2

1.16 Remote Controllers (Wired and Wireless)

By making use of optional liquid crystal indoor unit remote controller switches, you can construct a versatile control system.
The remote controller control wiring for simplified remote controllers (CZ-02RE11P / CZ-03RE11P) is the same as that of standard remote controllers (CZ-01RT11P), but since the functions of the simplified remote controllers are limited, we recommend they should be used together with a central remote controller.

Appearance / Functions



- Large liquid crystal screen that displays operating status in detail.
- Preset temperature is indicated in digital display, and can be set in 1°C increments.
- Display of malfunction is also available for air cleaner units.
- Operation can be individually programmed to start and stop time up to 72 hours in advance.
- The remote controller is equipped with a thermostat sensor to realize better room temperature control.
- Room temperature and preset temperature are monitored by microcomputer, and cool/heat operation mode is selected automatically. (Applies only to simultaneous cool/heat type only)
- Cool, heat or fan operation mode can be selected by any indoor unit remote controller without using the cool/heat selector switch. (Applies to all UM Series equipment)
- The system can be monitored for malfunctions covering 40 items. Equipped with a “self-diagnosis function” which displays a message to let you know immediately when a malfunction occurs.
- Field settings can be made by remote controller.

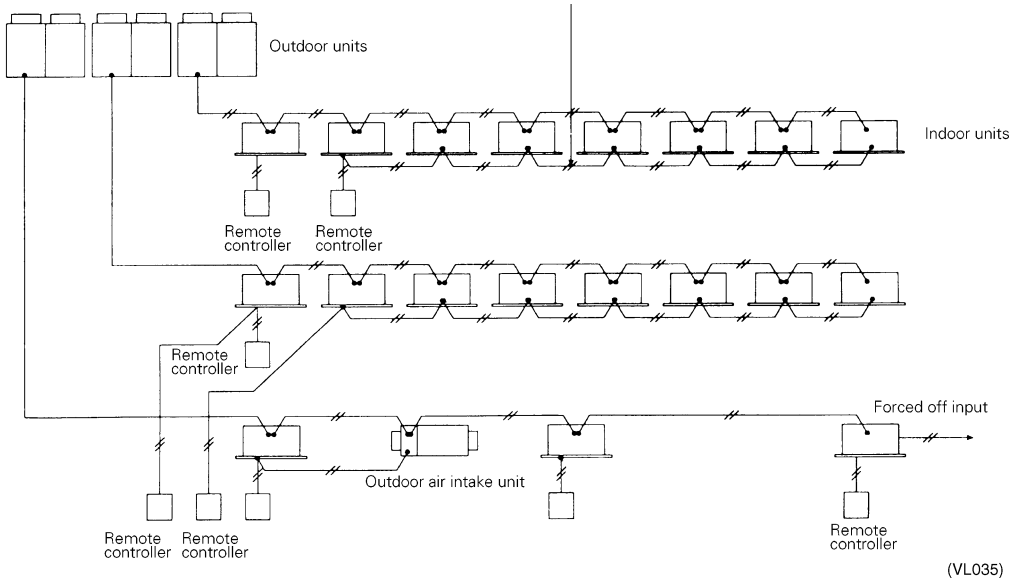
Remote Control Example

■ **Cool/heat operation mode selection control**

With the UM Inverter MX1, ME1 Series, you can select the cool/heat operation mode for outdoor units in the same system with an indoor unit remote controller.

■ **Group control**

Up to 16 indoor units can be simultaneously controlled with a single remote controller.



■ **Control by 2 remote controllers**

By connecting two remote controllers to a single indoor unit, you can for instance freely control from both in the room and from the control room (individual control), not to mention that you can carry out group control with two remote controllers.

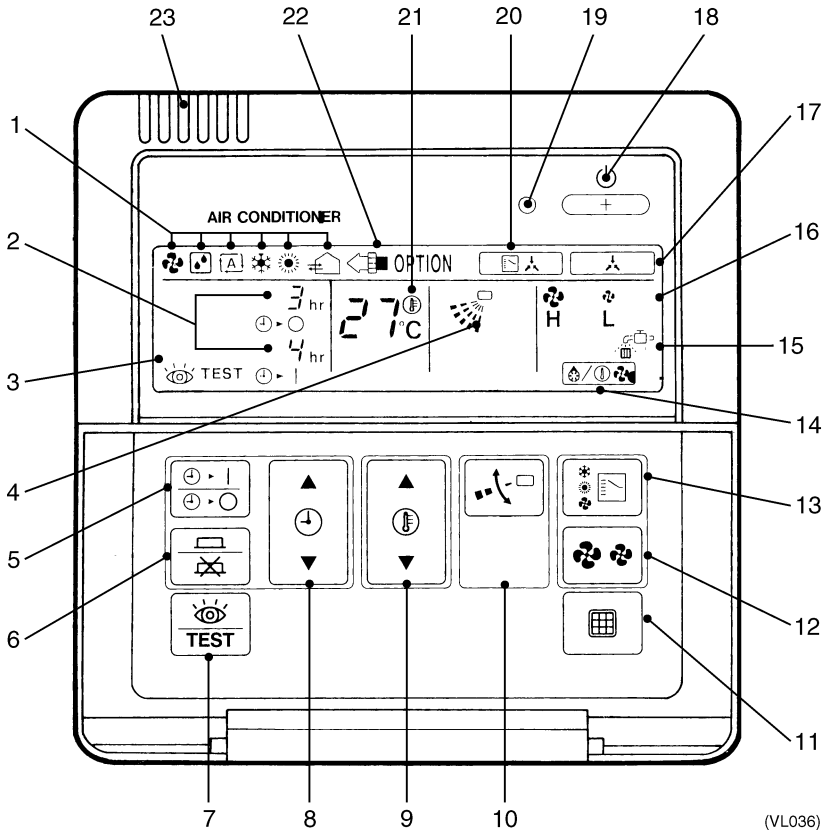
■ **Electrical appendices**

Remote controller wiring can be extended up to 500 meters, and you can easily make a central control setup in one place with indoor unit remote controllers set up in various places around the room.

■ **System extension**

Allows extension of the system such as a building control system or forced off command input by key control system.

Part Names and Functions



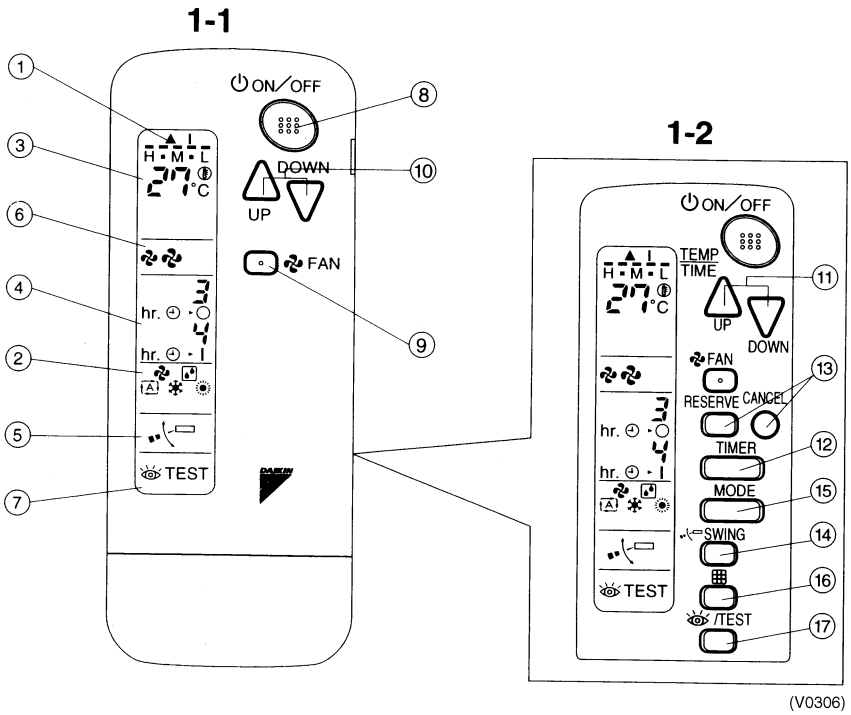
1	Operation mode display	13	Operation mode selector button
	Displays status during operation. • “Auto” can be set only for cool/heat simultaneous operation systems.		Push to switch the operation mode. ∗Note
2	Display programmed time	14	Defrost / hot start display
	Displays programmed time.		Displayed when defrosting.
3	Inspection / test operation display	15	Air filter cleaning time display
	When the inspection / test operation button is pushed, displays whether the system is in the inspection or test operation mode.		Displays the preset temperature when air condition operation exceeds a certain period of time.
4	Display air flow / flap	16	Display of fan speed
	Displays “fixed” or “swing” for air direction.		Displays set fan speed.
5	Time mode START/STOP button	17	Display “under centralised control”
	Push to start and stop the timer.		Displayed when under centralised control.
6	Timer ON/OFF button	18	ON/OFF button
	Push to turn the timer on or off.		One push starts the system, and a second push stops the system again.
7	Inspection / test operation button	19	Operation lamp (Red)
	Push for inspection or test operation.		Lights during operation.
8	Programming time button	20	Display “changeover under control”
	Push to set programming time.		Cool/heat/auto/dry cannot be be switched with remote controllers equipped with this display.
9	Temperature control button	21	Preset temperature display
	Push to set temperature.		Displays the preset temperature.
10	Air flow direction adjustment button	22	Display ventilation/cleaning
	Push to set the air flow direction to “fixed” or “swing.”		Displayed when connected to dust collector, etc., equipped with total heat exchanger unit.
11	Filter sign reset button	23	Thermostat sensor in remote controller
	After cleaning the filter, push to cancel the air filter cleaning time.		Senses the room temperature near the remote controller.
12	Fan speed adjustment button		
	Each time this button is pushed, fan speed toggles between “high” and “low.”		

Note: ∗ Works only for remote controller set to have cool/heat selection permission.

1.16.1 Applicable Wireless Remote Controller Models

Type		CS-LM	CS-DM	CS-UM	CS-FM	CS-TM	CS-KM	CS-PM CS-RM	CS-EM CS-NM
Wireless remote controller	H / P	CZ-01RWL12P	CZ-02RWD12P	CZ-01RWU12P	CZ-02RWF12P	CZ-01RWT12P	CZ-01RWK12P	CZ-02RWF12P	CZ-02RWF12P

Part Names and Functions

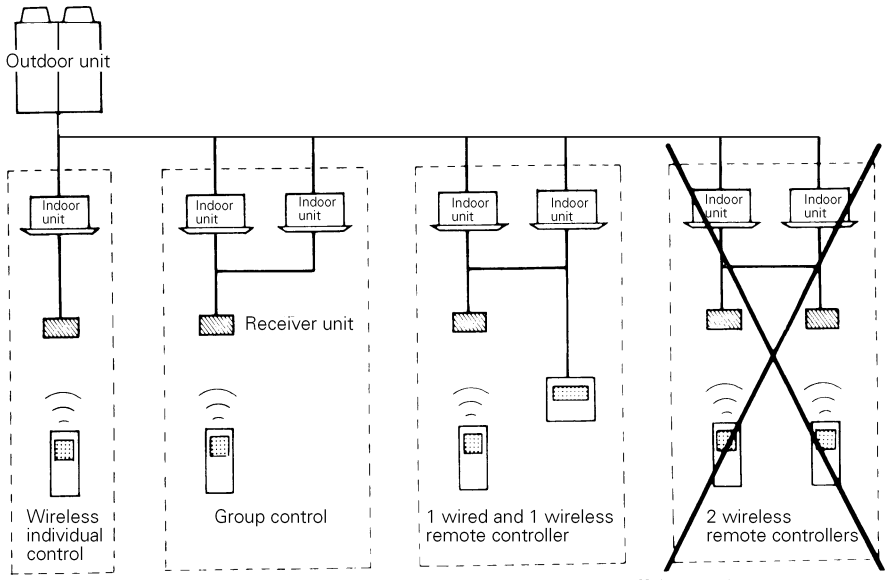


①	**DISPLAY " ▲ " (SIGNAL TRANSMISSION)** This lights up when a signal is being transmitted.
②	**DISPLAY " " " " " " " " " " (OPERATION MODE)** This display shows the current OPERATION MODE. For straight cooling type, " " (Auto) and " " (Heating) are not installed.
③	**DISPLAY " " (SET TEMPERATURE)** This display shows the set temperature.
④	**DISPLAY " " (PROGRAMMED TIME)** This display shows PROGRAMMED TIME of the system start or stop.
⑤	**DISPLAY " " (AIR FLOW FLAP)**
⑥	**DISPLAY " " " " (FAN SPEED)** The display shows the set fan speed.
⑦	**DISPLAY " /TEST" (INSPECTION/ TEST OPERATION)** When the INSPECTION/TEST OPERATION BUTTON is pressed, the display shows the system mode is in.
⑧	**ON/OFF BUTTON** Press the button and the system will start. Press the button again and the system will stop.
⑨	**FAN SPEED CONTROL BUTTON** Press this button to select the fan speed, HIGH or LOW, of your choice.
⑩	**TEMPERATURE SETTING BUTTON** Use this button for SETTING TEMPERATURE (Operates with the front cover of the remote controller closed.)
⑪	**PROGRAMMING TIMER BUTTON** Use this button for programming "START and/or STOP" time. (Operates with the front cover of the remote controller opened.)
⑫	**TIMER MODE START/STOP BUTTON**
⑬	**TIMER RESERVE/CANCEL BUTTON**
⑭	**AIR FLOW DIRECTION ADJUST BUTTON**
⑮	**OPERATION MODE SELECTOR BUTTON** Press this button to select OPERATION MODE.
⑯	**FILTER SIGN RESET BUTTON** Refer to the section of MAINTENANCE in the operation manual attached to the indoor unit.
⑰	**INSPECTION/TEST OPERATION BUTTON** This button is used only by qualified service persons for maintenance purposes.

(NOTE)
- For the sake of explanation, all indications are shown on the display in Figure 1 contrary to actual running situations.
- Fig. 1-2 shows the remote controller with the front cover opened.

(V0309)

Example of System Using Wireless Remote Controller



The receiver unit is connected to the wired remote controller line.

The wired remote controller is set as the master and the wireless remote controller is set as the slave. (The wired remote controller has the host function.) A malfunction will occur if the master/slave designation is opposite.

This combination cannot be used or a malfunction will occur.

(VL038)

For control by two remote controllers, be sure to designate the indoor unit remote controller as the master. The only combination that can't be used is two wireless remote controllers. Transmission wiring between the separately installed receiver unit and indoor unit can be up to 200 meters long.

Comparison of Functions of Wired and Wireless Remote Controllers

Function /display	Wired remote controller	Wireless remote controller
Operation lamp	Remote controller LED	Receiver unit LED
ON/OFF	Toggles between on and off each time the button is pushed.	
Operation mode selection	Selects operation mode. Cool/heat mode cannot be switched during changeover under control.	Selects operation mode. Cool/heat display switches during changeover under control.
Air flow direction setting	The air flow direction is set by adjusting with the air flow direction adjustment button while viewing setting position in the liquid crystal display.	The air flow direction is set by adjusting with the air flow direction adjustment button while viewing the position of the louver.
Filter sign reset	Resets the filter and element cleaning display.	Resets the filter and element cleaning display. Displayed by optical sensor LED.
Display "time to clean air cleaner element" Filter sign display	Remote controller LCD display	Displayed by receiver unit LED.
Display "ventilation/cleaning"	Displayed when air cleaner unit is connected.	Ventilation/cleaning displayed by receiver unit LED.
Defrost hot start	Displays defrost and hot start.	Displayed by receiver unit LED.
Display "under centralised control"	Displayed during centralised control.	Not displayed, but you are warned by a buzzer sound emitted from the receiver unit .
Display "changeover under control"	Displayed when cool/heat mode cannot be switched.	Not displayed (you are warned by a buzzer sound when the mode cannot be switched).
Thermostat sensor in remote controller	Equipped	Not equipped
Ventilation mode	Equipped	Not equipped

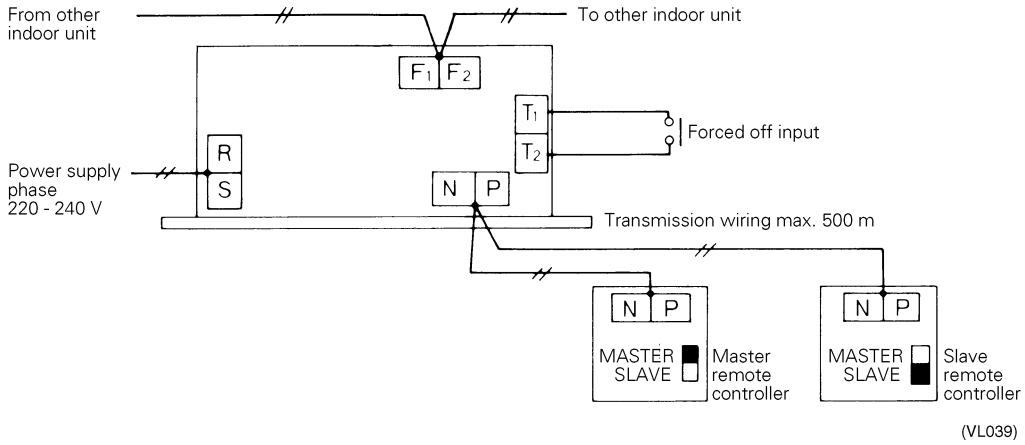
- All operation buttons (preset temperature, fan speed, timer, inspection / test operation, cool/heat selection permission and group No. setting for centralised control) function in the same manner.

1.17 Control by Remote Controller (Double Remote Controllers, Group, Remote)

Double Remote Controllers

Lets you control a single indoor unit using two remote controllers in different locations.

System which is convenient for cases where for instance you may want to control an indoor unit in the reception room from your office, or when you may want to have fine control of a far away indoor unit at your fingertips. (Applies to other indoor unit types as well.)



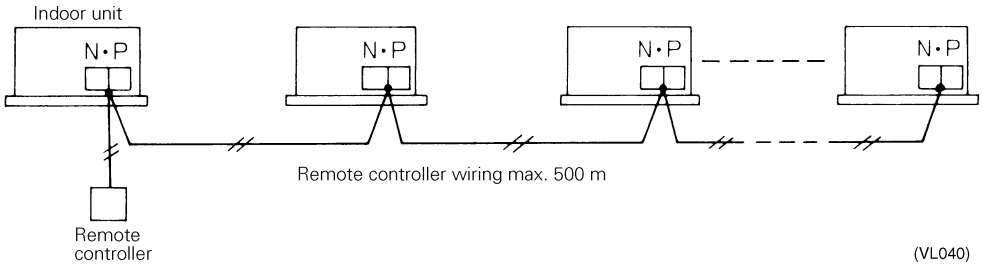
Note: The remote controller contains a thermostat sensor. If the master and slave remote controllers are located in different rooms, set field setting to “Not used” by the master remote controller. (No need field setting to “Not used” for the slave remote controller)

- Operation control for indoor units is last command priority.
- Remove the remote controllers’ front panels and set the MASTER/SLAVE switch on the remote controller’s built-in PC board to MASTER for the master remote controller and SLAVE for the slave remote controller. Field setting can be made only for the master remote controller.

Group Control

Up to 16 indoor units are simultaneously controlled as a group with single remote controller.

System which is convenient for cases where for instance you may want to simultaneously control several indoor units with the same settings, such as on a huge single floor.



Note: Shows remote controller wiring only.

- Remote controller wiring for group control has no polarity, so it doesn’t matter if N and P are connected inversely.
- Settings are the same for all indoor units in the group, and each indoor unit is controlled individually by its thermostat sensor.
- Address is set automatically for group control, so there is no need to set the address for by the group control remote controller.

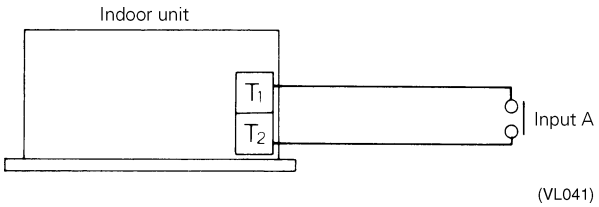
Remote Control

Forced OFF or ON/OFF control of indoor units can be input from outside.

Enables indoor units to be turned on and off by a building control or key control system.

1. Wiring method and specifications

Remote control is carried out by connecting input from outside to pins T1 and T2 on the terminal block (for remote controller and transmission wiring)



Wiring specifications	Sheathed vinyl cord or cable (double core)
Wiring thickness	0.75~1.25mm²
Wiring length	MAX 100m
Outside contact specs.	Contact which guarantees min. applicable load of 15 VDC, 10 mA

Forced OFF	ON/OFF control
Forced OFF by input A “ON” (remote controller prohibited)	On by input A “OFF” → “ON”
Remote controller permitted by input A “OFF”	OFF by input A “ON” → “OFF”

2. Operation contents

Input A of forced stop and stop operation operates as described in the table above.

3. Forced OFF and ON/OFF control selection

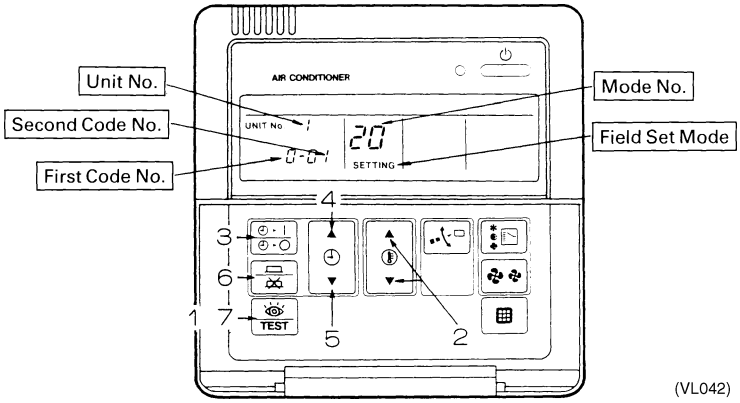
- Switch input by remote controller after turning on the power supply.
- Set field setting mode with the remote controller.
- When you enter the field setting mode, select mode No. 12, and set the first code No. to “1.” for forced OFF, set the second code No. to “01,” and from ON/OFF control, set to “02.” (Factory set is forced OFF.)

1.18 Indoor Field Setting

Making a field setting

Field settings must be made by remote controller if optional accessories have been installed on the indoor unit, or if the indoor unit or HRV unit's individual functions have been modified.

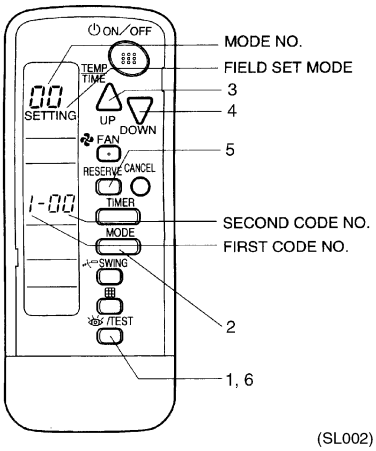
1.18.1 Wired Remote Controller <CZ-01RT Type>



(VL042)

1. When in the normal mode, push the TEST button for 4 seconds or more, and operation then enters the "field set mode."
2. Select the desired "mode No." with the button.
3. During group control and you want to set by each individual indoor unit (when mode No. 20, 21, 22, 23, 25 has been selected), push the time mode button and select the "indoor unit No." to be set.
   Note: This operation is not required when setting as a group.
4. Push the button and select the first code No.
5. Push the button and select the second code No.
6. Push the timer button one time and "define" the currently set contents.
7. Push the TEST button to return to the normal mode.

1.18.2 Wireless Remote Controller <CZ-01·02RW Type>



(SL002)

1. When in the normal mode, push the /TEST button for 4 seconds or more, and operation then enters the "field set mode."
2. Select the desired "mode No." with the MODE button.
3. Pushing the UP button, select the first code No.
4. Pushing the DOWN button, select the second code No.
5. Push the RESERVE button and check the settings.
6. Push the /TEST button to return to the normal mode.

Notes:

1. Settings are made simultaneously for the entire group, however, if you select the mode No. inside parentheses, you can also set by each individual unit. Setting changes however cannot be checked except in the individual mode for those in parentheses.
2. The mode numbers inside parentheses cannot be used by wireless remote controllers, so they cannot

be set individually. Setting changes also cannot be checked.

3. The second code No. is factory set to “01.” The field set air flow position setting is however factory set to “02.”
4. Do not make settings other than those described above. Nothing is displayed for functions the indoor unit is not equipped with.
5. “88” may be displayed to indicate the remote controller is resetting when returning to the normal mode.

1.18.3 Setting Contents and Code No.

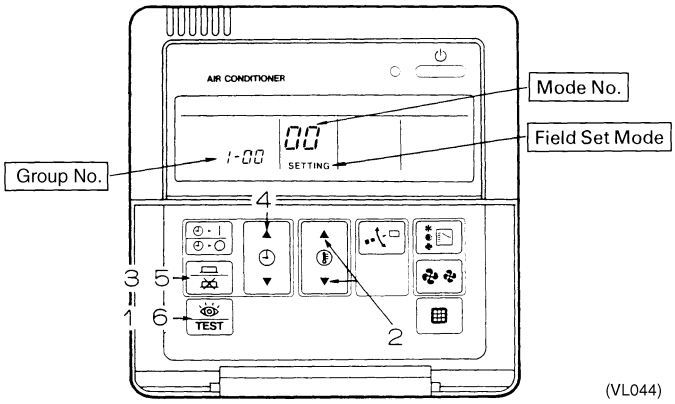
UM system indoor unit settings	Mode No. Note 2	First Code No.	Setting Contents		Second Code No.(Note 3)							
					01		02		03		04	
	10(20)	0	Filter contamination heavy/light (Setting for display time to clean air filter) (Sets display time to clean air filter to half when there is heavy filter contamination.)	Super long life filter	Light	Approx. 10,000 hrs.	Heavy	Approx. 5,000 hrs.	—		—	
				Long life filter		Approx. 2,500 hrs.		Approx. 1,250 hrs.				
				Standard filter		Approx. 200 hrs.		Approx. 100 hrs.				
		1	Long life filter type (CS-LM only, 01 indicates long life)		Long life filter		Super long life filter		—		Soot filter	
		2	Thermostat sensor in remote controller		Use		No use		—			
		3	Display time to clean air filter calculation (Set when filter sign is not to be displayed.)		Display		No display		—			
	12(22)	0	Optional accessories output selection (field selection of output for adaptor for wiring)		Indoor unit turned ON by thermostat				Operation output		Malfunction output	
		1	ON/OFF input from outside (Set when ON/OFF is to be controlled from outside.)		Forced OFF		ON/OFF control		External protection device		—	
		2	Thermostat differential changeover (Set when remote sensor is to be used.) CS-LM, CS-UM, CS-DM, CS-TM only		1°C		0.5°C		—		—	
		3	OFF by thermostat fan speed		LL		Set fan speed		—		—	
		4	Automatic mode differential (automatic temperature differential setting for UM series heat recovery system cool/heat)		01:0	02:1	03:2	4:03	05:4	6:05	7:06	08:7
		5	Power failure automatic reset		Not equipped		Equipped		—		—	
	13(23)	0	High air outlet velocity (Set when installed in place with ceiling higher than 2.7 m.) CS-UM only		N		H		—		—	
		1	Selection of air flow direction (Set when a blocking pad kit has been installed.) CS-UM only		F (4 directions)		T (3 directions)		W (2 directions)		—	
		2	Horizontal air discharge		Equipped		Not equipped				—	
		3	Air flow direction adjustment (Set at installation of decoration panel.) CS-DM only		Equipped		Not equipped				—	
		4	Field set air flow position setting		Draft prevention		Standard		Ceiling Soiling prevention		—	
		5	Field set fan speed selection (fan speed control by air discharge outlet for phase control)		Standard		Optional accessory 1		Optional accessory 2		—	
	15(25)	1	Thermostat OFF excess humidity		Not equipped		Equipped		—		—	
		3	Drain pump humidifier interlock selection		Not equipped		Equipped		—		—	
		4	Sets whether filter sign is to be output by time or by input.		Time addition		Input		—		—	
		5	Field set selection for individual ventilation setting by remote controller		Not equipped		Equipped		—		—	
		6	Field set selection for individual ventilation setting by remote controller		Not equipped		Equipped		—		—	

1.19 Centralised Control Group No. Setting

CZ-01RT Type

- If carrying out centralised control by central remote controller or unified ON/OFF controller, group No. must be set for each group individually by remote controller.
- Group No. setting by remote controller for centralised control

1. When in the normal mode, push the TEST button for 4 seconds or more, and operation then enters the “field setting mode.”
2. Set mode No. “00” with the button. *
3. Push the timer button to inspect the group No. display.
4. Set the group No. for each group with the button (The group No. increases in the manner of 1-00, 1-01, ...,1-15, 2-00,...4-15. However, the unified ON/OFF controller displays only the group No. within the range selected by the switch for setting each address.)
5. Push the timer button to define the selected group No.
6. Push the TEST button to return to the normal mode.

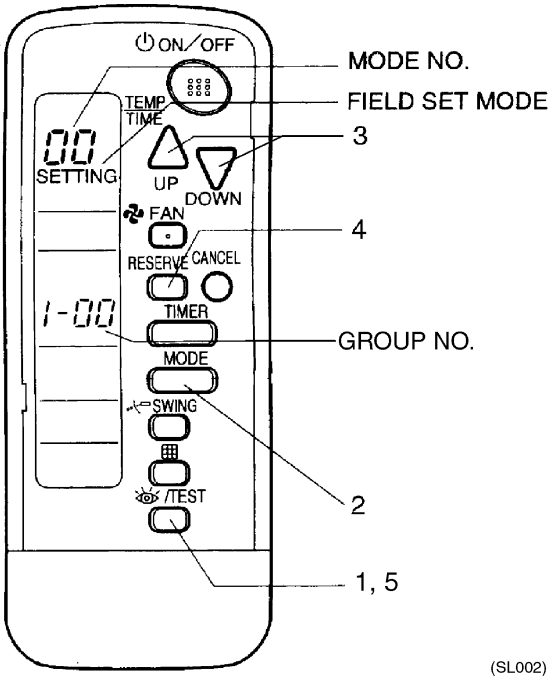


- Even if not using a remote controller, connect the remote controller when setting the group No., set the group No. for centralised control, and disconnect after making the setting.
- Set the group No. after turning on the power supply for the central remote controller, unified ON/OFF controller, and indoor unit.

CZ-01·02RW Type

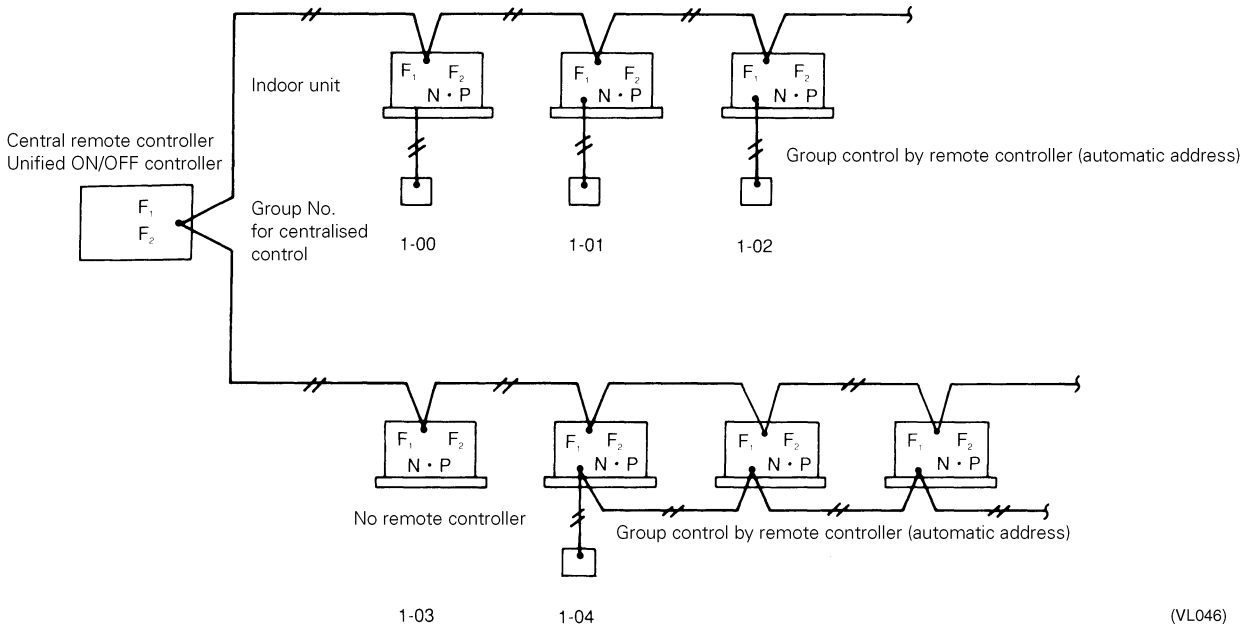
■ Group No. setting by wireless remote controller for centralised control

1. When in the normal mode, push the /TEST button for 4 seconds or more, and operation then enters the “field set mode.”
2. Set mode No. “00” with the MODE button.
3. Set the group No. for each group with the UP DOWN button (advance/backward).
4. Enter the selected group numbers by pushing the RESERVE button.
5. Push the /TEST button and return to the normal mode.



(SL002)

Group No. Setting Example



(VL046)

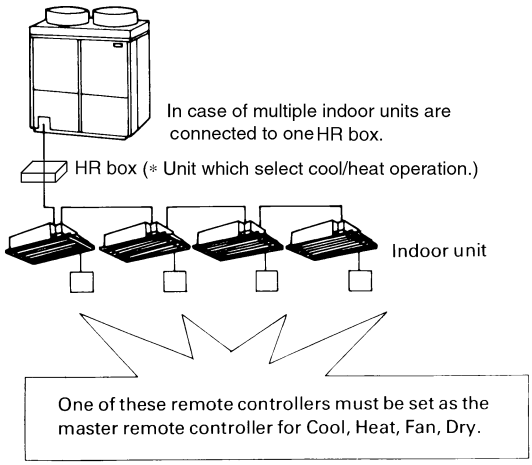
■ If you have to set the address for each unit for calculating cost, etc., set the mode No. to “30.”

1.20 Setting of Master Remote Controller

By Indoor Unit Remote Controller

Operation mode (Fan, Dry, Cool, Heat) can be freely selected by indoor unit remote controller for the UM Series outdoor units, however, as shown in the example below, the remote controller of one of the indoor units connected to 1 outdoor unit must be set as the master remote controller for Fan, Dry, Cool, Heat. (Operation mode can be switched by only the remote controller set as the master remote controller.)

UM "MX1, ME1 Series"


In case of multiple indoor units are connected to one HR box.
HR box (* Unit which select cool/heat operation.)
Indoor unit
One of these remote controllers must be set as the master remote controller for Cool, Heat, Fan, Dry.
(VL047)

Setting Method

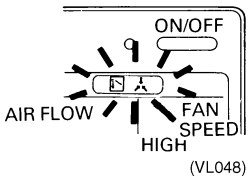
Preparations

When turning the power supply on for the first time, the display of **<CHANGEOVER UNDER CONTROL>** lights when the power supply is turned on.

When you want to set:

1	Set the outdoor unit's cool/heat selector (Filed setting mode1) to inside.

Setting of master remote controller

2	Continue pushing **<OPERATION MODE SELECTOR>** for about 4 seconds. The display of **<CHANGEOVER UNDER CONTROL>** on all remote controllers connected to the same outdoor unit blinks. 

Setting of master remote controller

3	Push the **<OPERATION MODE SELECTOR>** of the remote controller you want to set as the master remote controller. This completes the setting. The remote controller is now set as the master remote controller and the display of **<CHANGEOVER UNDER CONTROL>** goes off. **<CHANGEOVER UNDER CONTROL>** is displayed on the other remote controllers.

Operation mode selection

4	Push the **<OPERATION MODE SELECTOR>** of the master remote controller (remote controller not displaying **<CHANGEOVER UNDER CONTROL>**) the amount of times required to select the desired operation mode. Each push switches the display from FAN to DRY, COOL, and HEAT. The operation mode changes automatically for all remote controllers that are not set as a master remote controller.

Operation Contents and Function

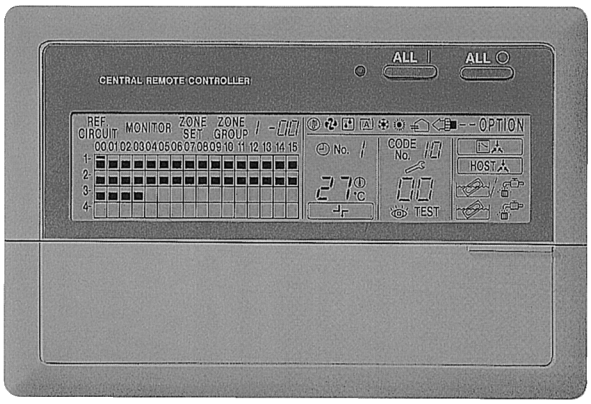
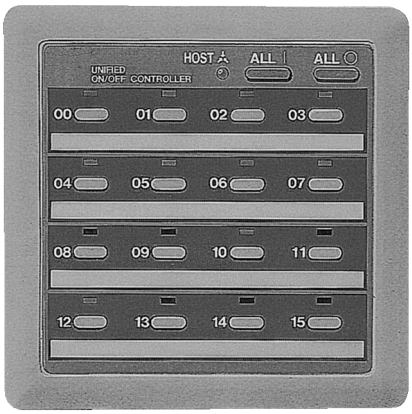
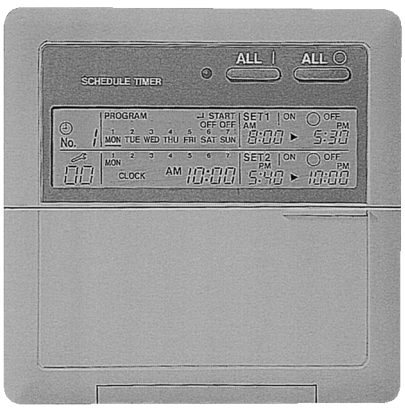
1. If you set a Master remote controller (Remote controller not displaying **<CHANGEOVER UNDER CONTROL>**) → to COOL/HEAT → The other remote controllers (Remote controllers displaying **<CHANGEOVER UNDER CONTROL>**)
   - switch to the operation mode set by the master remote controller.
   - However, they can switch to FAN operation and from COOL to

2. If you set a Master remote controller (Remote controller not displaying **<CHANGEOVER UNDER CONTROL>**) → to FAN, → The other remote controllers (Remote controllers displaying **<CHANGEOVER UNDER CONTROL>**)
   - cannot set any mode other than FAN.

(VL049)

1.21 Centralised Control Devices

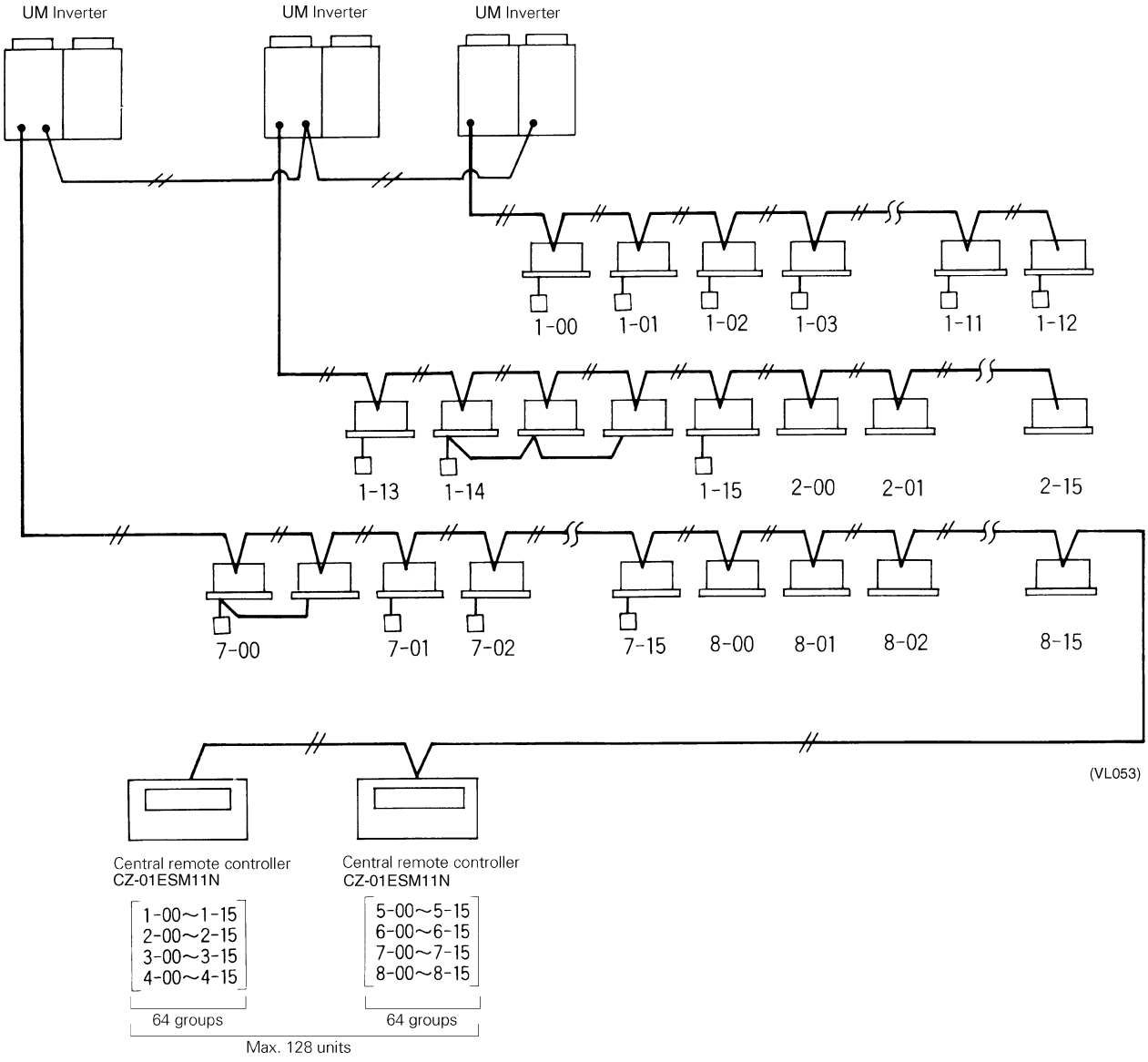
1.21.1 Appearance

Central remote controller	Model No.	CZ-01ESM11P
	Appearance	
	No. of units that can be connected within one control wiring system	Up to 2
Unified ON/OFF controller	Model No.	CZ-01ANA11P
	Appearance	
	No. of units that can be connected within one control wiring system	Up to 8
Schedule timer	Model No.	CZ-01ESW11P
	Appearance	
	No. of units that can be connected within one control wiring system	1
Common	Indoor unit start method	Sequential start

■ The control range setting (connector or switch) inside the controller is altered to increase the number of units that can be connected within one control wiring system.

1.21.2 When Using Centralised Control Device

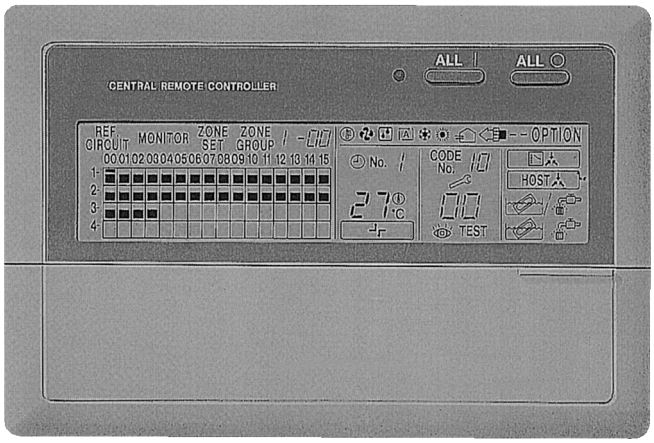
- Up to 128 indoor units can be connected within a system. (Group control is not required to increase the number of units that can be connected within the system.)
- When double remote controllers are connected, the same indoor unit cannot be registered for more than one central remote controller.



- Up to 2 central remote controllers can be connected per system.
- Up to 8 unified ON/OFF controllers can be connected per system.
- Only 1 schedule timer can be connected per system.

1.22 Central Remote Controller (CZ-01ESM11P)

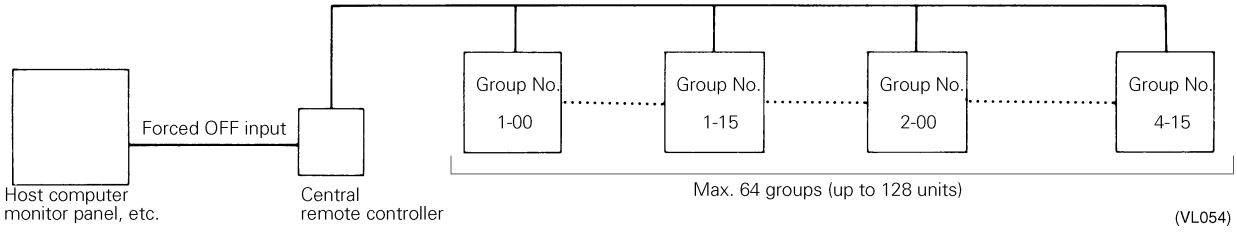
Enables central control with the performance of a series of remote controllers by connecting with up to 64 groups of indoor units (128 units).



- ◆ You can connect with up to 64 groups of indoor units (128 units) and monitor or perform operations such as turning on/off individually or simultaneously, setting temperature, etc., by the zone.
- ◆ Designed to save labor of operation, and is able to execute zone control for up to 64 zones.
- ◆ Malfunction contents are given in code, so maintenance or inspection can be carried out quickly.
- ◆ Lets you connect 1 schedule timer and 4 unified ON/OFF controllers per central remote controller, and enables you to freely expand the central control system in accordance with scale and use.
- ◆ Wiring can be extended up to 1 km. Besides crossover wiring, bus or star type can also be used.

1.22.1 System Configuration

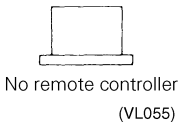
With a central remote controller, you can simultaneously turn up to 64 groups of indoor units on or off (up to 128 units). You can also turn on or off, set operation and control modes such as operation controlled by timer, make operation by remote controller possible or impossible, and control or display operation conditions such as preset temperature by zone. (Case where operation controlled by timer is used in combination with schedule timer.) By group, you can display operation conditions such as operation mode and preset temperature. Connection by forced OFF input (non-voltage a contact) with outside key system or host computer monitor panel is impossible.



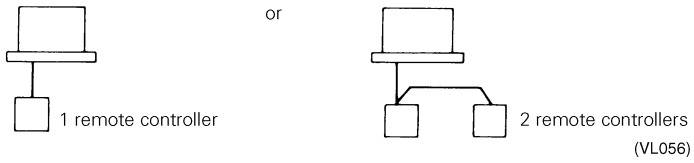
This optional accessory cannot be used in combination with optional accessory BMS interface adaptor for individual and unified control (KRP4A51, 52) or unified group (KRP2A51, 52).

A Group of Indoor Units

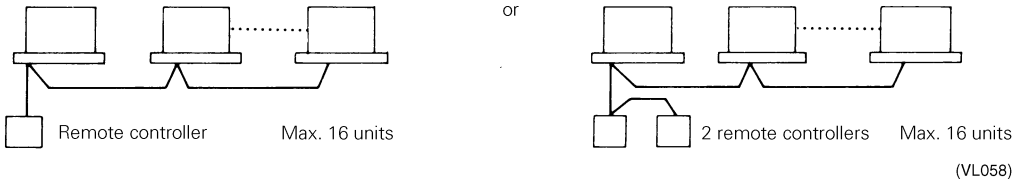
1. 1 indoor unit with no remote controller



2. 1 indoor unit controlled by either 1 or 2 remote controllers

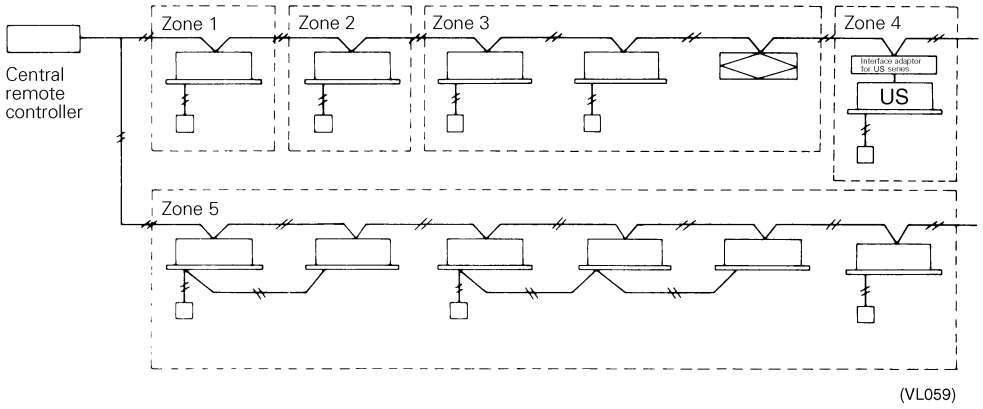


3. Max. 16 indoor units controlled by either 1 or 2 remote controllers



Zone Control by Central Remote Controller

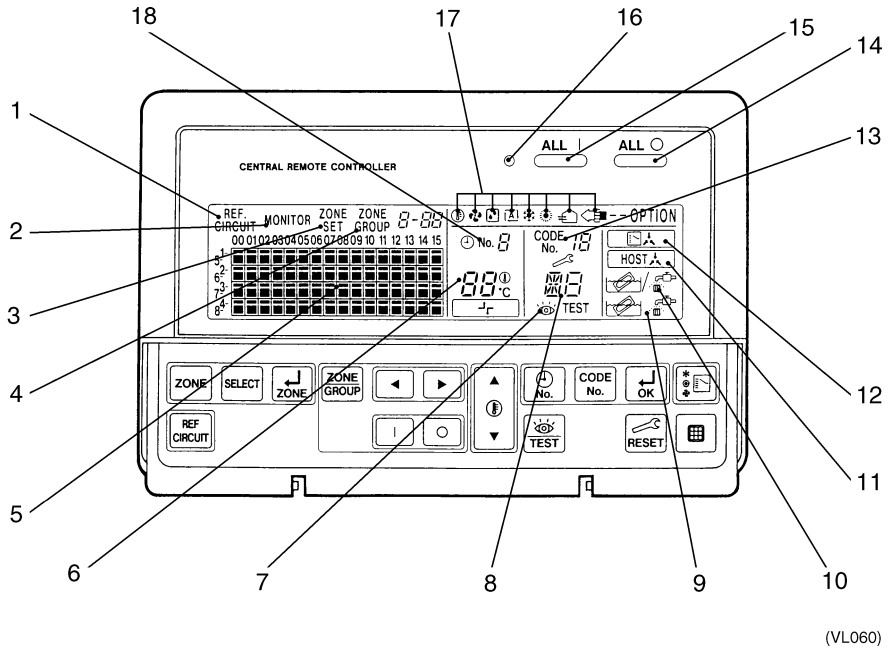
A "zone" is a collection of 1 or more groups.
Zone control lets you make settings for several groups simultaneously in order to facilitate the task of setting.



By setting once, everything in the zone becomes set to the same setting. The number of zones that can be set by the central remote controller is MINI~MAX 64 zones. (The number of groups in 1 zone is MINI~MAX 64 groups.) The manner of linking zones can be set as desired with the central remote controller.

1.22.2 Central Remote Controller Part Names and Functions

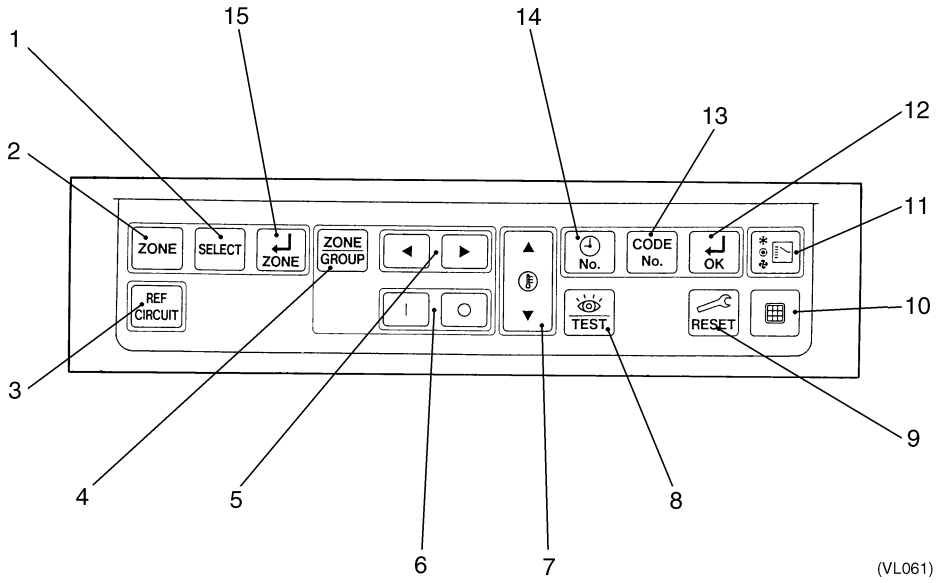
Display Section (All items in the display are lit for the purpose of explanation, contrary to when actually operating.)



(VL060)

1	Refrigerant system display	10	Display of time to clean
	The inclaction in the square is lit while the refrigerant system is being displayed.		Lights when it's time to clean the element or filter of any group.
2	Display "monitor"	11	Display "under host computer integrated control"
	Lights for display "monitor."		Settings cannot be made while this indicator is lit.
3	Display of zoning	12	Display "changeover under control."
	Light for zone set mode.		Cool/heat cannot be selected for zones or groups of this display.
4	Display of zone/group	13	Control mode display
	Status display indicates whether operation is by zone or group.		Displays mode of control (ON/OFF control impossible by remote controller, centralised, individual, etc.) in code. If there is an indoor unit stopped due to malfunction, the display indicates that unit's unit No.
5	Group No. in operation	14	Unified stop button
	Each square displays the state corresponding to each group.		Stops all indoor units.
6	Display (preset temperature)	15	Unified operation button
	Displays the preset temperature.		Runs all indoor units.
7	Display (inspection/test)	16	Operation lamp
	Press the inspection/test operation button. Either the inspection or test lamp lights up.		Lights even if 1 controlled indoor unit is running.
8	Display (malfunction code)	17	Display "operation mode"
	Displays the contents of a malfunction. The lamp flashes when a malfunction stops operation. The contents of the current malfunction are displayed in the inspection mode.		Indicates status of operation/
9	Display of "time to clean air cleaner element/time to clean air filter"	18	Display of timer No.
	Lights when it's time to clean the element or filter of indicated group.		Indicates the operation timer No. when used in combination with a schedule timer.

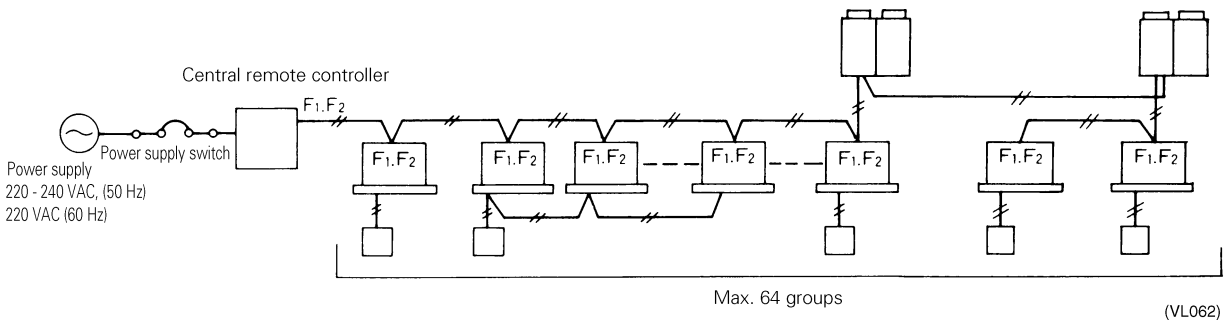
Control Section



1	Selector button	9	Clearing button for malfunction code memory
	Selects group belonging to the zone.		Push to reset the malfunction code.
2	Zone setting button	10	Filter sign reset button
	Turns zone setting mode on or off.		Turns the filter cleaning indicator off.
3	Button for refrigerant system display	11	Operation mode selector button
	Indicates indoor unit group connected to same outdoor unit.		Sets to operation mode.
4	Zone/group changeover button	12	Timer ON button
	Selects zone or group display.		Defines control mode and timer No.
5	Advance/backward button	13	Control mode button
	Sets zone with several groups.		Selects the control mode.
6	ON/OFF button	14	Timer No.button
	Runs or stops for each zone.		Selects timer No. (Only when used in combination with a schedule timer)
7	Temperature setting button	15	Zone operation ON/OFF button
	Push to set temperature.		Defines zone.
8	Inspection/test operation button		
	Push when you want to carry out inspection or test operation.		

1.22.3 Control Wiring

Wiring Outline



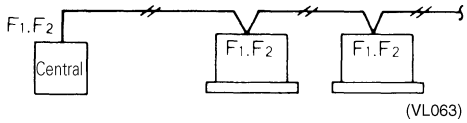
Wiring specifications

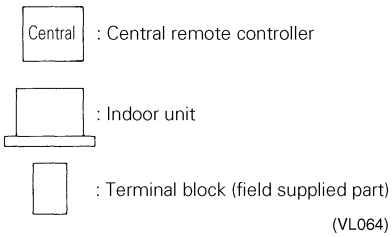
Power supply wiring	2 mm²
Transmission wiring for control	0.75 ~ 1.25 mm² sheathed vinyl cord or cable (double core); max. extension 1000 m (total wiring length 2000 m)
Power supply switch	10A

Control Wiring Connection Example

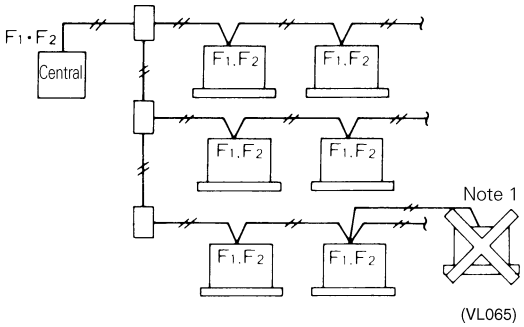
(Indoor units in same system shown in the following examples.)

1. Series wiring

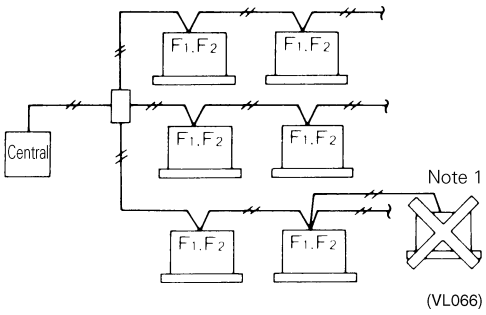




2. Bus wiring (can be branched in max. 16 locations)
   Example showing 3 branches



3. Star wiring (can be branched in max. 16 locations)
   Example showing 3 branches

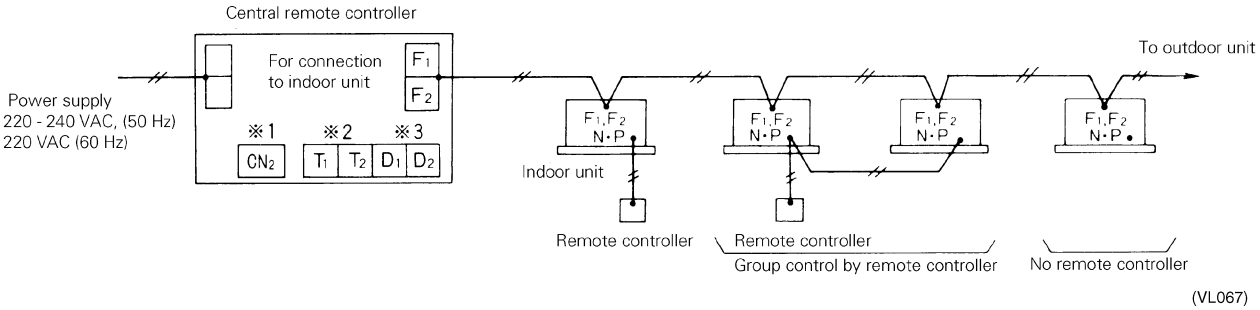


Notes

1. Cannot be branched again after being branched once.
2. Use a junction terminal block if branching 3 or more control wires from the same terminal block.
3. Do not connect transmission wiring between indoor and outdoor units of different refrigerant circuits.

Wiring to Indoor Units

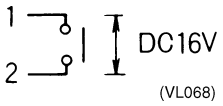
The terminals (F1, F2) of the control terminal block of the central remote controller and the terminals (F1, F2) of indoor units for which a group No. has been set are wired as shown in the figure below. (There is no polarity, so it doesn't matter if F1 and F2 are wired inversely.)



∗ 1. Connector for unification adaptor for computerized control (CN2)

∗ 2. Forced OFF input (T1, T2)

Forced OFF input (no-voltage contact for micro-current) turns off all indoor units while the contact is "closed." Use a contact which guarantees min. applicable load of 16VDC, 10 mA.



∗ 3. Power supply for schedule timer (D1, D2)

1.22.4 Contents of Control Modes

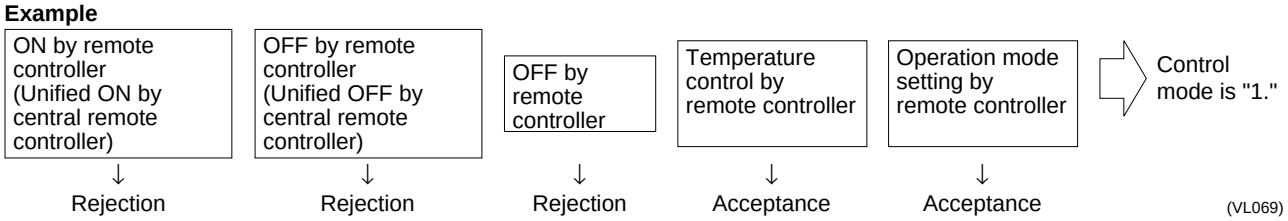
Twenty modes consisting of combinations of the following five operation modes with temperature and operation mode setting by remote controller can be set and displayed by operation modes 0 through 19.

- ON/OFF control impossible by remote controller
  Used when you want to turn on/off by central remote controller only.
  (Cannot be turned on/off by remote controller.)
- OFF control only possible by remote controller
  Used when you want to turn on by central remote controller only, and off by remote controller only.
- Centralised
  Used when you want to turn on by central remote controller only, and turn on/off freely by remote controller during set time.
- Individual
  Used when you want to turn on/off by both central remote controller and remote controller.
- Timer operation possible by remote controller
  Used when you want to turn on/off by remote controller during set time and you do not want to start operation by central remote controller when time of system start is programmed.
- The operation modes are from 0 through 19, however, they can only be set for outdoor units (UM MX1 Series) for which cool/heat can be selected by indoor unit. With the exception of this, settings are 0 through 9.

How to Select Operation Mode

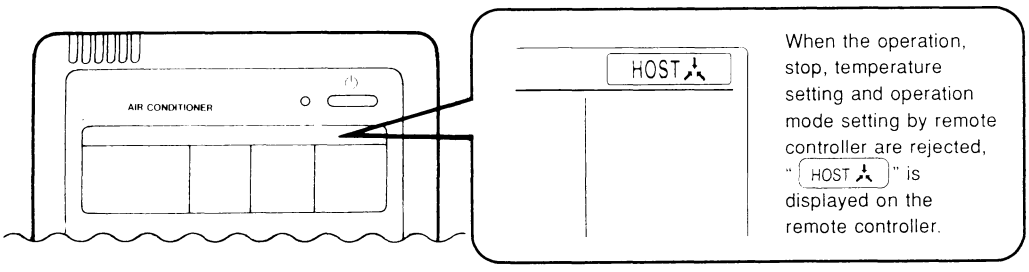
Whether operation by remote controller will be possible or not for turning on/off, controlling temperature or setting operation mode is selected and decided by the operation mode given on the right edge of the table below.

Example



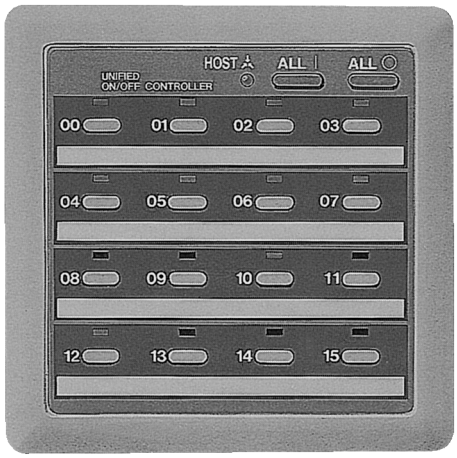
Control mode	Control by remote controller					Control mode
	Operation		OFF	Temperature control	Operation mode setting	
	Unified operation, individual operation by central remote controller, or operation controlled by timer	Unified OFF, individual stop by central remote controller, or timer stop				
ON/OFF control impossible by remote controller	Rejection (Example)	Rejection (Example)	Rejection (Example)	Rejection	Acceptance	0
					Rejection	10
				Acceptance (Example)	Acceptance (Example)	1(Example)
					Rejection	11
OFF control only possible by remote controller			Acceptance	Rejection	Acceptance	2
					Rejection	12
				Acceptance	Acceptance	3
					Rejection	13
Centralised	Acceptance			Rejection	Acceptance	4
					Rejection	14
				Acceptance	Acceptance	5
					Rejection	15
Individual		Acceptance		Rejection	Acceptance	6
					Rejection	16
				Acceptance	Acceptance	7
					Rejection	17
Timer operation possible by remote controller	Acceptance (During timer at ON position only)	Acceptance (During timer at ON position only)		Rejection	Acceptance	8
					Rejection	18
				Acceptance	Acceptance	9
					Rejection	19

Do not select “timer operation possible by remote controller” if not using a remote controller. Operation by timer is impossible in this case.


AIR CONDITIONER
HOST
When the operation, stop, temperature setting and operation mode setting by remote controller are rejected, " HOST " is displayed on the remote controller.
(VL070)

1.23 Unified ON/OFF Controller (CZ-01ANA11P)

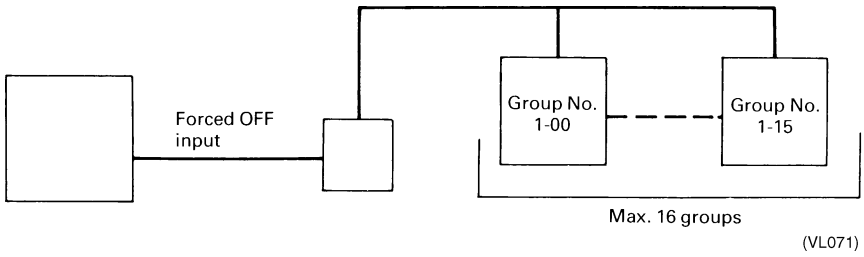
Turns each group of indoor units on/off individually or simultaneously for up to 16 groups (128 units), and lets you check the operation/malfunction display all at once at a glance.



- Lets you turn up to 16 groups of indoor units (128 units) on/off simultaneously or individually, and lets you check the operation/malfunction display all at once at a glance.
- By combining with a central remote controller or schedule timer, you can build a system that matches scale and use .
- Features compact size casing with thickness of only 16 mm. (Uses JIS recessed box for 2)
- Wiring can be extended up to 1 km. For the wiring method, bus type and star type wiring crossover wiring can be used as well as crossover wiring.

1.23.1 System Configuration

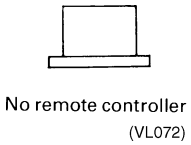
Up to 16 groups of indoor units can be turned on/off individually or simultaneously by unified ON/OFF controller. Also lets you connect with an outside key system or host computer monitor panel by forced OFF input (no-voltage a contact).



(This optional accessory cannot be used in combination with optional accessory BMS interface adaptor for individual and unified control, for unified group.)

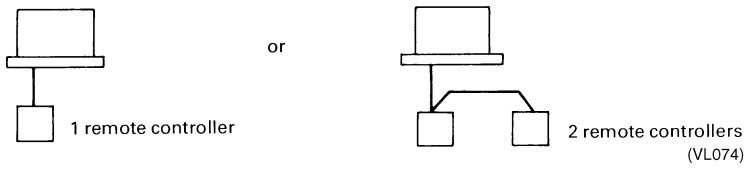
A Group of Indoor Units

1. 1 indoor unit with no remote controller

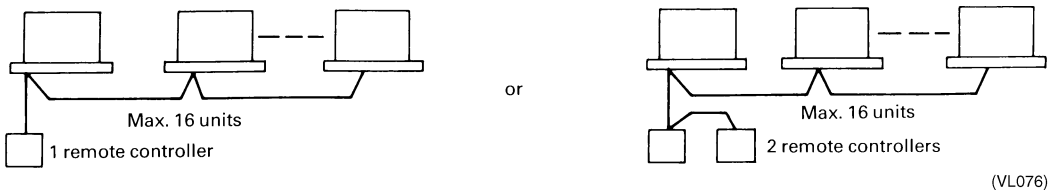


Note: If not using remote controllers, use in combination with central remote controller.

2. 1 indoor unit controlled by either 1 or 2 remote controllers

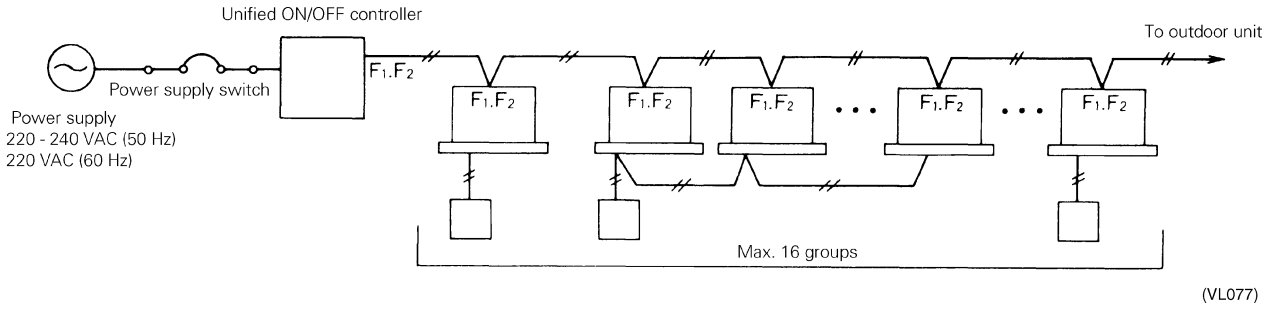


3. Max. 16 indoor units group-controlled by either 1 or 2 remote controllers



1.23.2 Wiring for Transmission

Wiring Outline



Wiring specifications

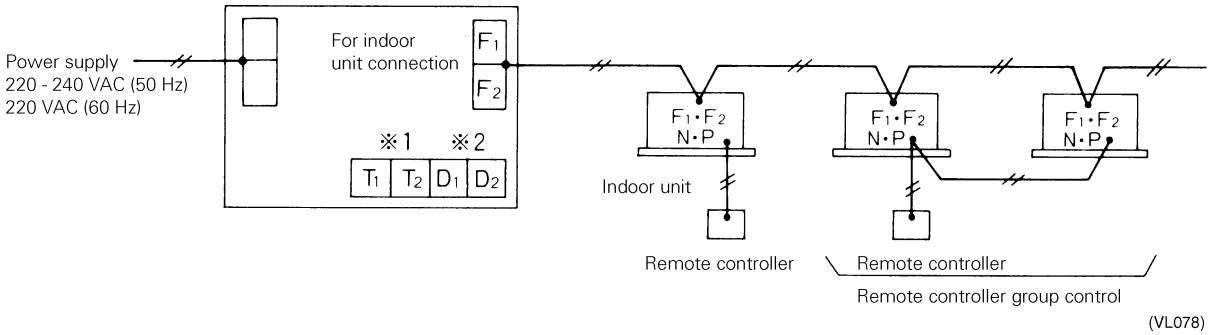
Power supply wiring	2 mm²
Wiring for transmission	0.75 ~ 1.25 mm² sheathed vinyl cord or cable (double core); max. extension 1000 m (total wiring length 2000 m)
Power supply switch	10A

Connection Example of Wiring for Transmission

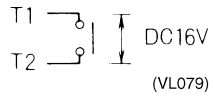
(1)series wiring, (2)bus type wiring and (3)star type wiring are the same as with a central remote controller.

Wiring for Indoor Unit

Terminals F1 and F2 of the unified ON/OFF controller's terminal block for control and terminals F1 and F2 of the indoor unit with set group No. are wired as shown in the figure below. (There is no polarity, so it doesn't matter if F1 and F2 are inverted.)



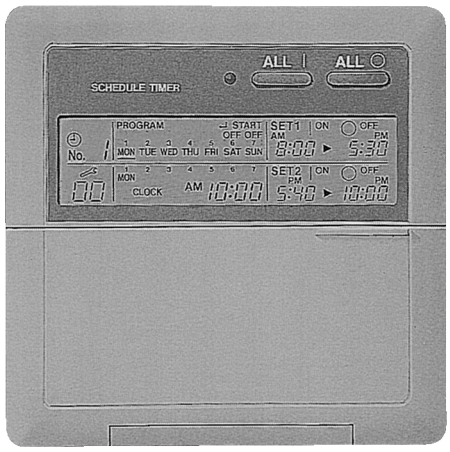
∗ 1: Forced OFF input (T1, T2)
All connected indoor units go off and do not run while forced OFF input (for no-voltage contact, micro-current) is "closed." Use a contact that can guarantee a 16 VDC, 10 mA minimum applicable load.



Note: If using an instantaneous contactor, use one that handles conducting time of 200 msec or more.
∗ 2: Power supply for schedule timer (D1, D2)
∗ Wire only if 1, 2 and 3 are used.

1.24 Schedule Timer (CZ-01ESW11P)

Allows you to connect and manage by unified control the weekly schedule of up to 128 indoor units.

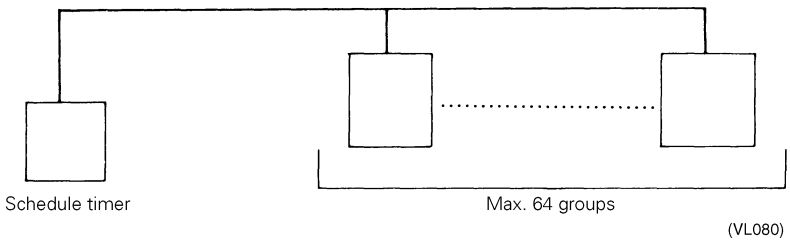


- Manages by unified control the weekly schedule of up to 128 indoor units.
- Lets you set in 1-minute increments on/off time twice a day by the week.
- By combining with a central remote controller or unified ON/OFF controller, you can build a system that matches scale and use.
- When using in combination with a central remote controller, you can set up to eight weekly schedule patterns and distribute among zones by central remote controller as desired.
- Equipped with a power failure compensation function effective for up to 48 hours.
- Features compact size casing with thickness of only 16 mm. (Uses JIS recessed box for 2)
- Wiring can be extended up to 1 km. For the wiring method, bus type and star type wiring crossover wiring can be used as well as crossover wiring.

1.24.1 System Configuration and Electrical Wiring

With a schedule timer, you can program the time units will be turned on/off simultaneously for periods of one week each for up to 16 groups of indoor units.

System Configuration

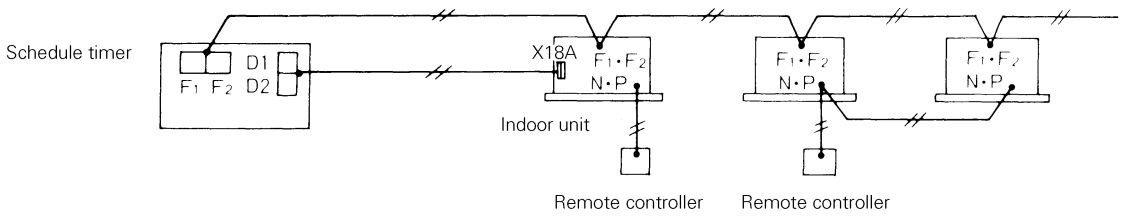


If using the schedule timer individually, you don't have to set the group No. setting for centralised control for group unified control.

Wiring for Transmission

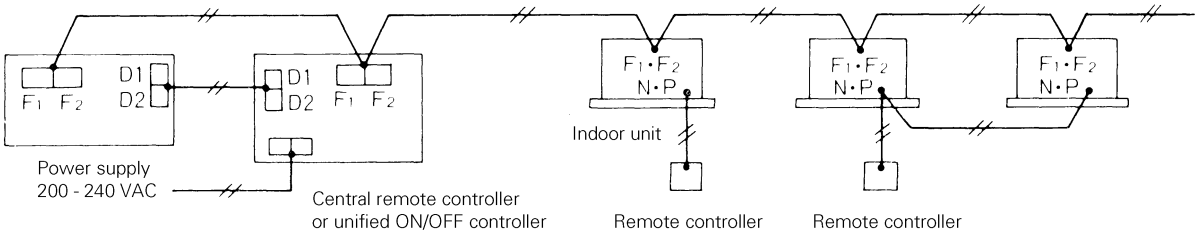
<Indoor unit wiring>

1. If schedule timer individual use:



- For the schedule timer's power supply, connect the schedule timer's connectors (D1/D2) and the connector on the indoor unit's PC board (CN18) with the attached cable and crimp style terminals.

2. If using in combination with other optional controllers for centralised control:



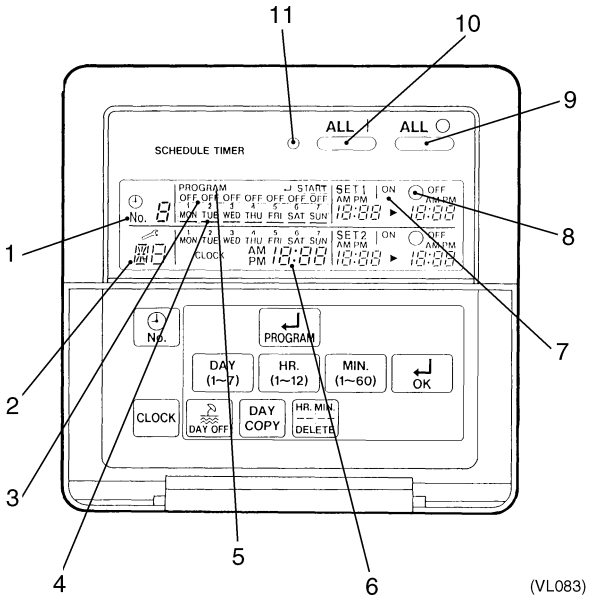
Wiring for transmission: 0.75~1.25 mm² sheathed vinyl cord or cable (double core)....Max. extension 1000 m (Total wiring length 2000 m)

<Connection example of wiring for transmission>

(1)series wiring, (2) bus type wiring and (3) star type wiring are the same as with a central remote controller.

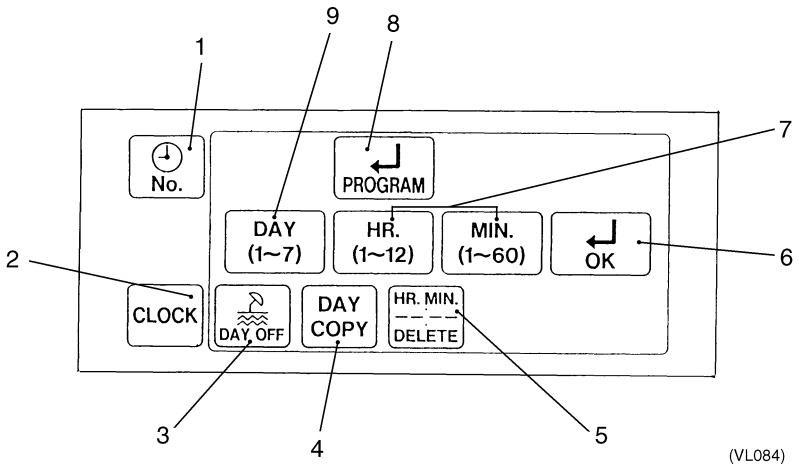
1.24.2 Schedule Timer Part Names and Functions

Display Section All items in the display are lit for the purpose of explanation, contrary to when actually operating



1	Programmed time No.	7	Display of programmed time of system start
	Displays time No. only when used in combination with a central remote controller.		Displays the time when the system is programmed to turn on.
2	Display of malfunction code	8	Display of programmed time of system off.
	Displays malfunction code.		Displays the time when the system is programmed to go off.
3	Display of holiday.	9	Unified stop button
	Displays day designated as a holiday inside a circle. The system is not programmed to turn on for days designated as a holiday.		Push to stop simultaneously without regard for the No. of programmed time.
4	Display of days of a week	10	Unified operation button
	Displayed and blinks below programmed day.		Push to turn on simultaneously without regard for the No. of programmed time
5	Display of programming start.	11	Operation lamp (red)
	Displayed when programmed to start by timer.		Lights during operation.
6	Display of present time		
	Displays the present day and time.		

Control Section



1	Clock adjusting button	6	Timer ON button
	Push to set the present time.		Sets the present time or programmed time.
2	Button for selecting days of a week	7	Hour/minute button
	Push when selecting days of a week.		Push to adjust the present time or programmed time.
3	Holiday setting button	8	Programming start button
	Sets holiday.		Push to set or check No. of programmed time. After completion, push again.
4	Button for copying programs of previous day	9	Clock adjusting button
	Sets to same No. of programmed time as previous day.		Push to set the present time.
5	Program canceling button		
	Cancels programmed time and sets display to [— : — —].		

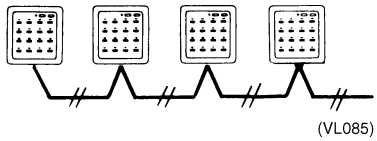
1.25 Combining Different Types of Centralised Control Devices

<CZ-01ESM11P·CZ-01ANA11P·CZ-01ESW11P>

In addition to using optional controllers for centralised control independently, you also combine and connect a schedule timer and unified ON/OFF controller with a central remote controller. By designing with components, you can construct the best central remote control system for your purpose and scale.

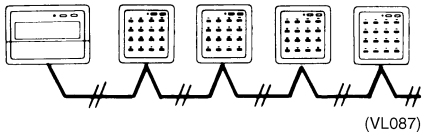
1.25.1 Example of CZ-01ESM11P / CZ-01ANA11P / CZ-01ESW11P Systems

■ Unified ON/OFF controller


(VL085)

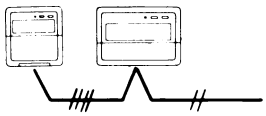
Unified ON/OFF controllers are connected in accordance with the number of indoor units. A single line network can contain up to 16 groups of four units each.

■ Central remote controller plus unified ON/OFF controller


(VL087)

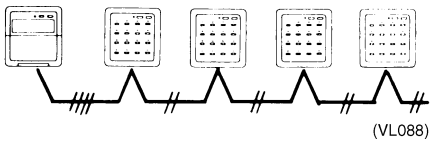
Combines the functionality of a central remote controller with the operability of a unified ON/OFF controller. Enables central control of up to 64 groups of indoor units.

■ Schedule timer plus central remote controller


(VL086)

Allows you to set up to eight weekly schedules for turning units ON/OFF twice each day. Enables scheduled operation of up to 64 groups of indoor units individually or by zone.

■ Schedule timer plus unified ON/OFF controller


(VL088)

Allows you to set the time for turning units ON/OFF twice each day.
Enables unified scheduled operation of up to 64 groups of indoor units.

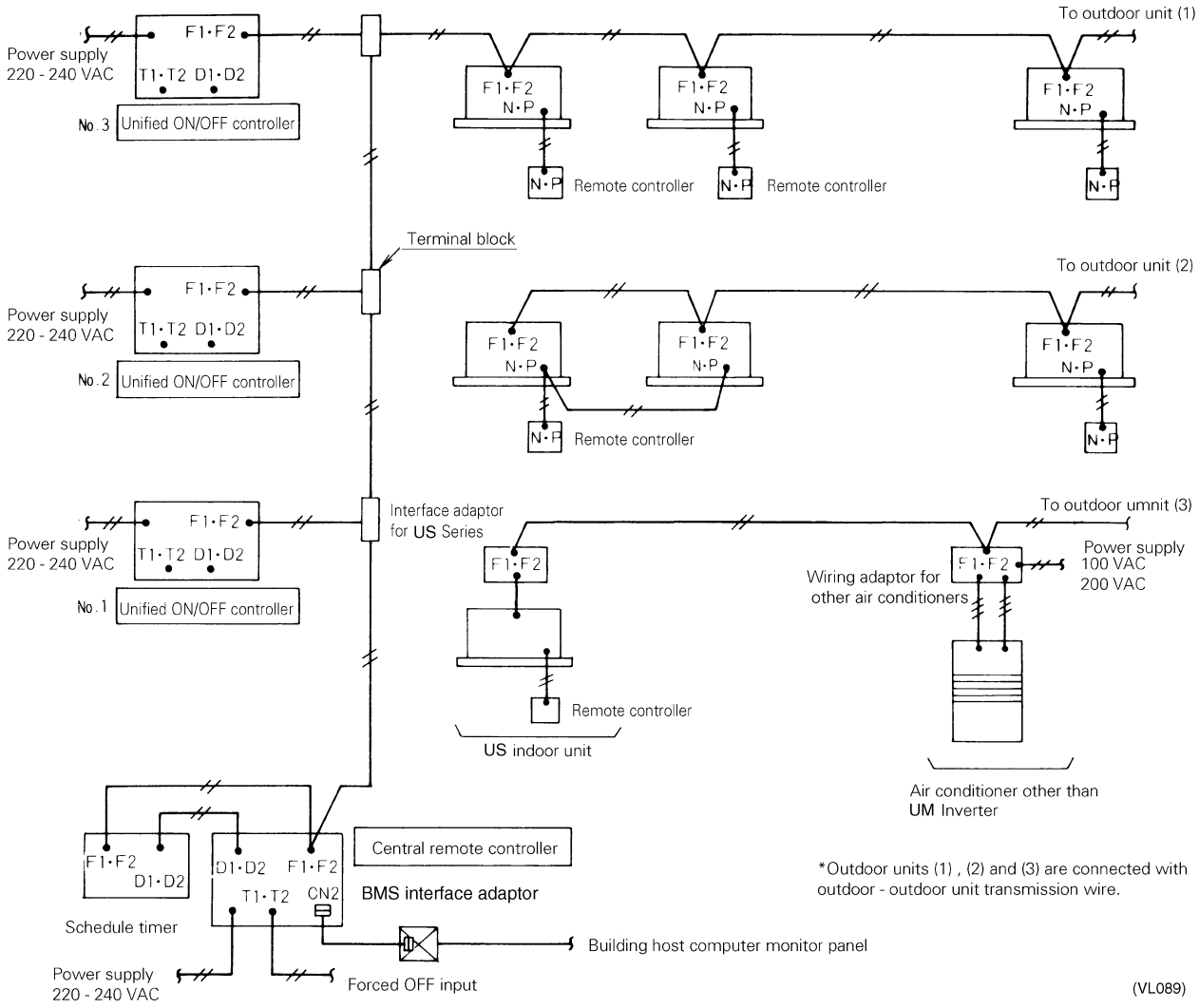
1.25.2 Connection for Optional Controller for Centralised Control

You can use any combination of two central remote controller, one schedule timer, and from one to eight unified ON/OFF controllers. The maximum number of units for a single system is 128.

Central remote controller CZ-01ESM11P	Unified ON/OFF remote controller CZ-01ANA11P	Schedule timer CZ-01ESW11P
2	—	—
2	1	—
2	2 ~ 8	—
2	—	1
2	1	1
2	2 ~ 8	1
—	1	—
—	2 ~ 8	—
—	1	1
—	2 ~ 8	1
—	—	1

1.25.3 Electric Wiring

Combination of one central remote controller, one schedule timer and three unified ON/OFF controllers



Initial Settings of Optional Controllers for Centralised Control

1. Central remote controller

◆ Leave the connector for setting master controller (CN) connected. (Connected at factory set.)
Connect this connector to one central control line only.

◆ Control mode
Sets priority sequence for control of central remote controller and indoor unit remote controllers.

◆ Zone setting
Sets zone for controlling several groups within the same zone.

2. Unified ON/OFF controller (No. 1, No. 2, No. 3 in figure above)

◆ Disconnect the connector for setting master controller (X1A).

◆ Switch for setting each address (DS1)
Sets the group No. address for each group of indoor units controlled by unified ON/OFF controller No. 1, No. 2 and No. 3 in the figure above. You can set 16 units (16 groups) for one unified ON/OFF controller.

◆ Control mode switch (DS2)
Sets priority sequence for control of central remote controller and indoor unit remote controllers. If used together with a central remote controller, however, the central remote controller's control mode has priority.

3. Schedule timer

◆ Leave the connector for setting master controller (X1A) disconnected. (Factory set)

◆ Control mode switch (SS2)
Sets priority sequence for control of schedule timer and indoor unit remote controllers. If used together with a central remote controller, however, the central remote controller's control mode has priority.

Group No. Setting Centralised Control

1. Set by indoor unit remote controller

◆ Sets group No. by remote controller in the field set mode. (Group No. are 1 - 00 ~ 1 - 15, 2 - 00 ~ 2 - 15, ...4 - 00 ~ 4 - 15.....)

2. Setting by PC board adaptor

◆ If using an interface adaptor for US Series or wiring adaptor for other air conditioners, set the centralised control group No. with group No. setting switches RS1 and RS2 on the PC board.
1 ~ 4 for RS1 (upper)
(1 ~ 8 for interface adaptor for US Series)
0 ~ F for RS2 (lower)

Part 4
Troubleshooting

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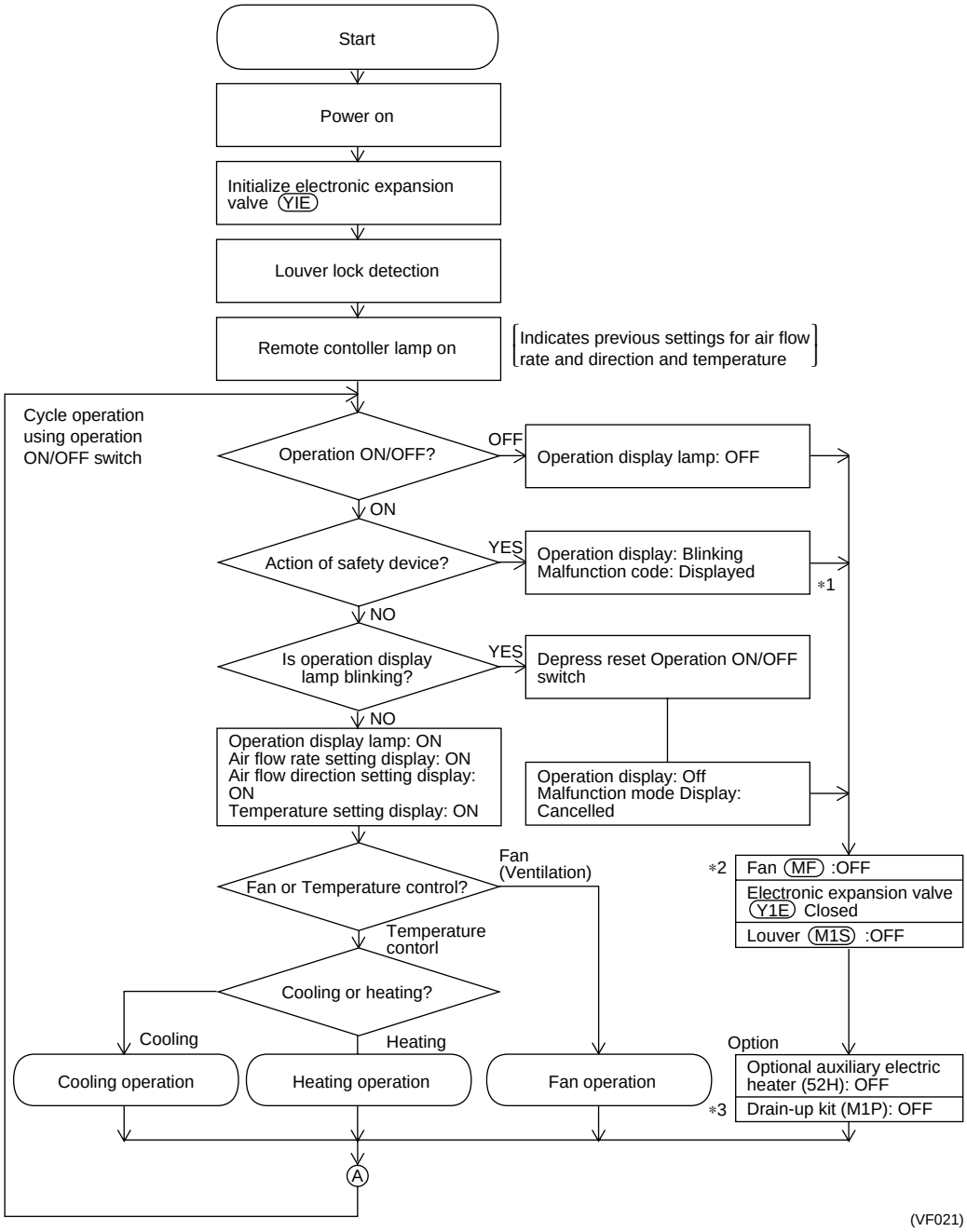
1. Operation Flowcharts

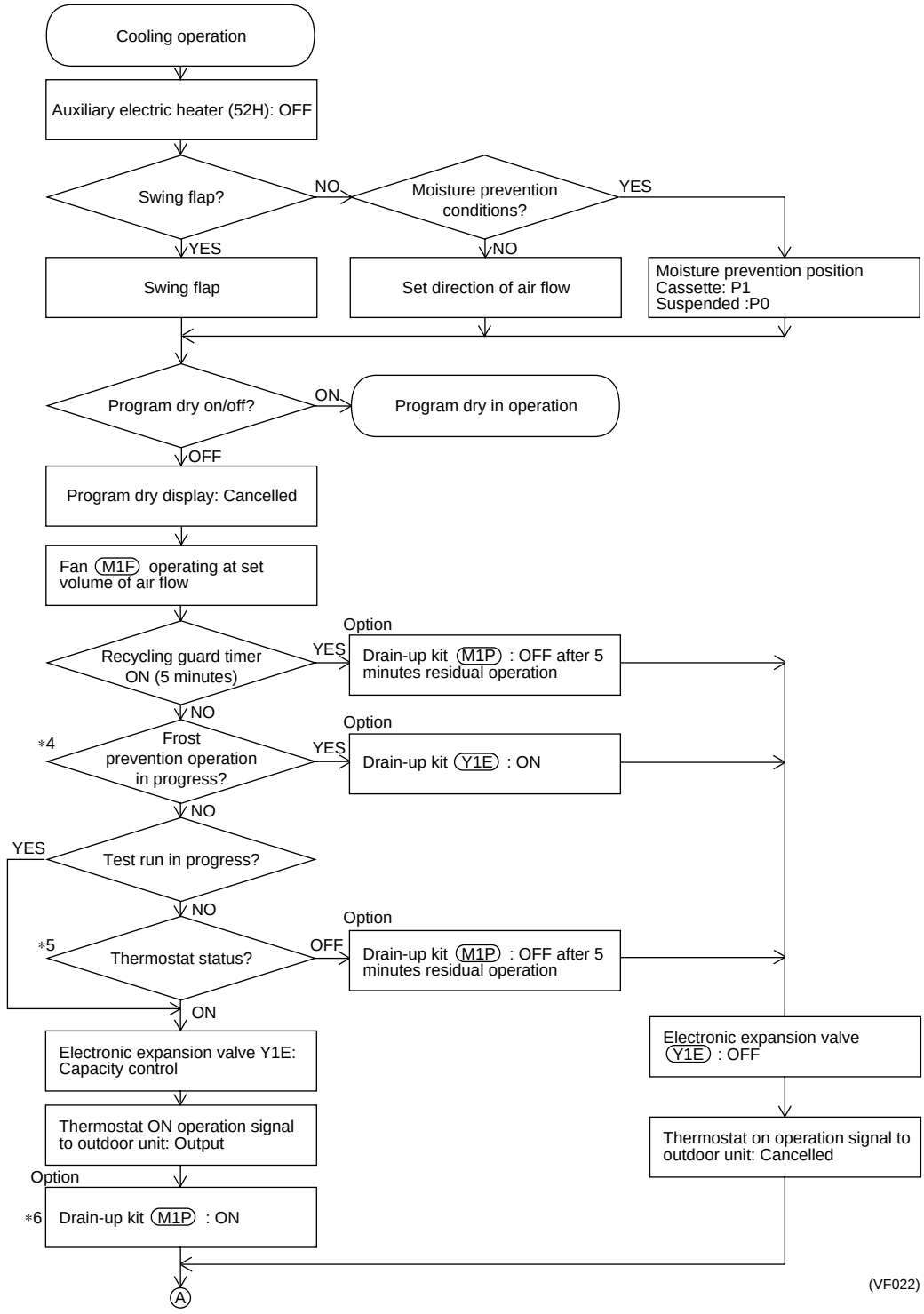
1.1 Indoor Unit Operation Flowchart



∗1 In the event of a malfunction, the malfunction code is displayed in the remote controller's malfunction code display.

∗2 When the auxiliary electric heater is on, the fan stops after one minute residual operation.

∗3 When the drain-up kit is ON, it stops after five minutes residual operation.

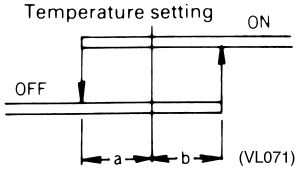


*4 If the evaporator inlet temperature is -5°C or lower for a total of 10 minutes, or is -1°C or lower for a total of 40 minutes, frost prevention operation is initiated. Normal operation resumes when the temperature is +7°C or higher for 10 consecutive minutes.

*5 Thermostat status

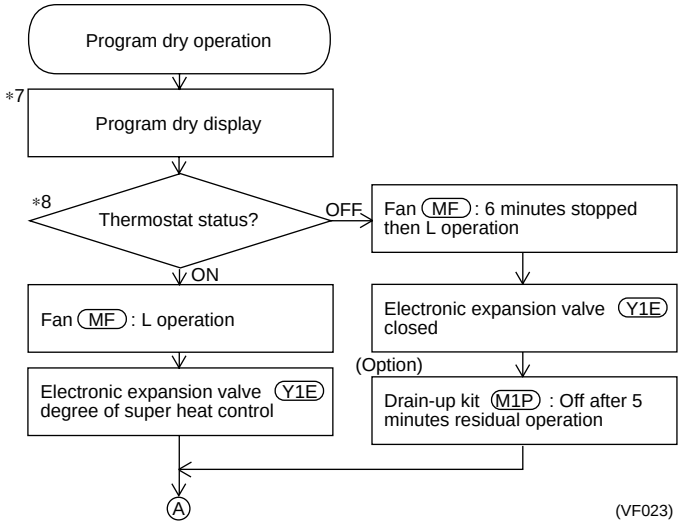
*6 The drain-up kit is standard equipment for models CS-UM, CS-DM and CS-FM.

Preset temperature



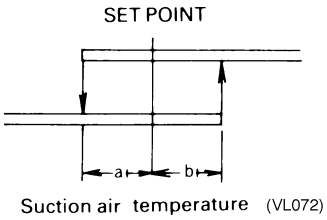
Intake air temperature

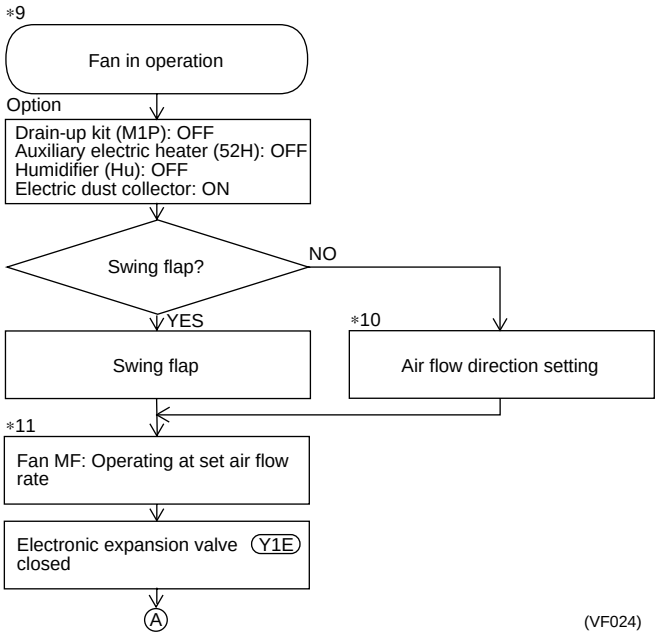
a = b = 1 (a = b = 0.5 possible for CS-LM, CS-UM, CS-TM, CS-DM only.)



∗7 Programmed dry display
Does not display preset temperature and air flow settings of the controller.

∗8 Thermostat status
Preset temperature during programmed dry operation.

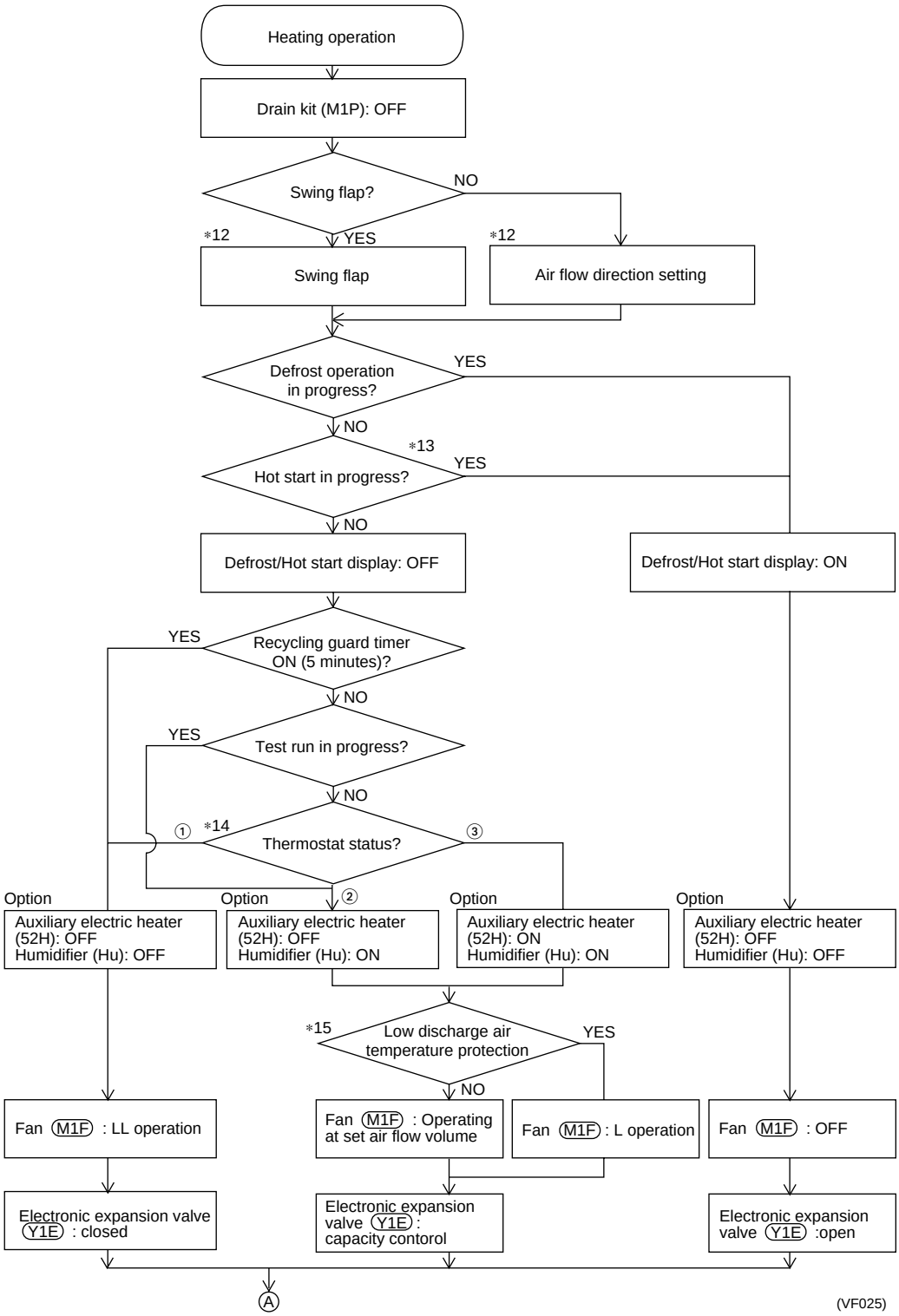




∗9 Fan operation
When fan operation has been selected using the remote controller, operation is turned OFF by thermostat when temperature control operation has been selected.

∗10 Air flow direction setting
If fan operation is selected with the remote controller, air discharge is 100% horizontal during heating.

∗11 Fan
If fan operation is selected with the remote controller, LL speed operation is carried out during heating.



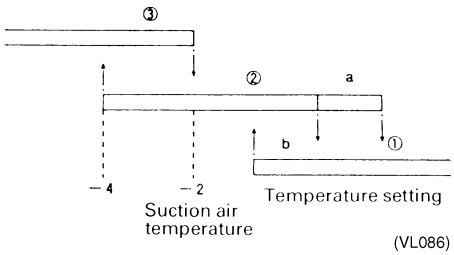
∗12 Air flow direction

Air discharge is 100% horizontal when heating operation is turned off by thermostat.

∗13 Hot start

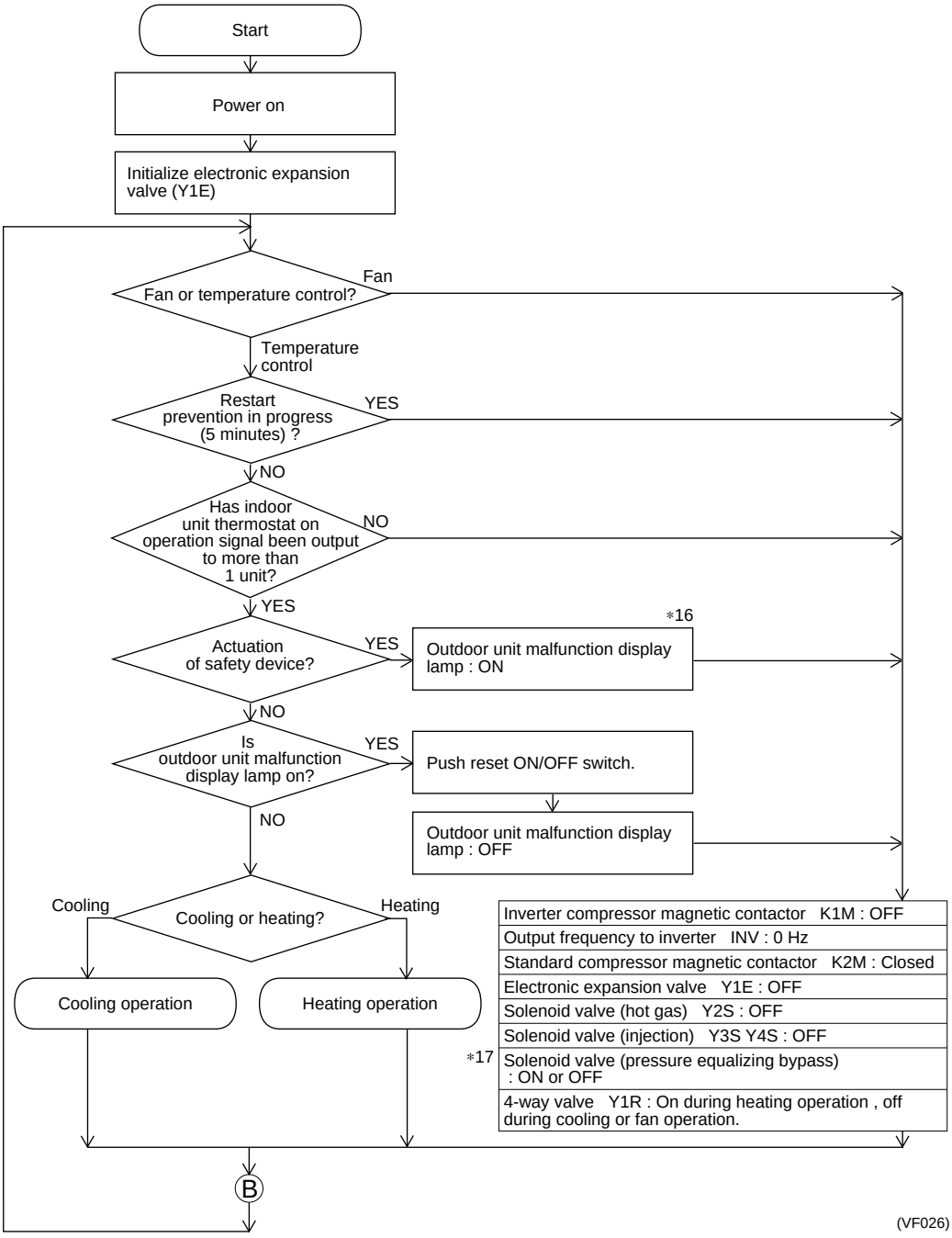
Hot start is carried out when operation starts or defrosting is complete, and condenser inlet temperature exceeds 34°C, or 3 minutes elapses, or when Tc > 52°C.

∗14. Thermostat status



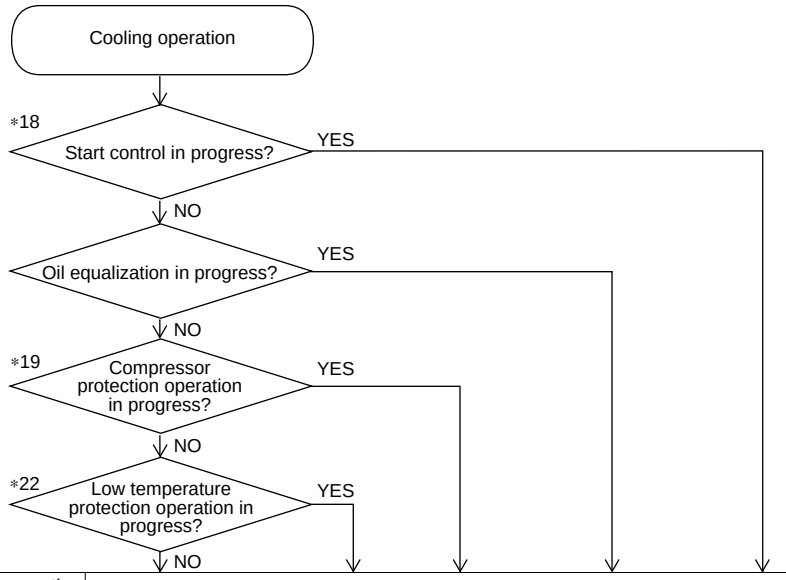
∗15 Low discharge air temperature protection
Protection is effected when the preset temperature is 24°C or lower and the opening of the electronic expansion valve is slight.

1.2 Outdoor Unit Operation Flowchart


Start
Power on
Initialize electronic expansion valve (Y1E)
Fan or temperature control?
Fan
Temperature control
Restart prevention in progress (5 minutes) ?
YES
NO
Has indoor unit thermostat on operation signal been output to more than 1 unit?
NO
YES
Actuation of safety device?
YES
∗16
Outdoor unit malfunction display lamp : ON
NO
Is outdoor unit malfunction display lamp on?
YES
Push reset ON/OFF switch.
Outdoor unit malfunction display lamp : OFF
NO
Cooling
Cooling or heating?
Heating
Cooling operation
Heating operation
∗17
Inverter compressor magnetic contactor K1M : OFF
Output frequency to inverter INV : 0 Hz
Standard compressor magnetic contactor K2M : Closed
Electronic expansion valve Y1E : OFF
Solenoid valve (hot gas) Y2S : OFF
Solenoid valve (injection) Y3S Y4S : OFF
Solenoid valve (pressure equalizing bypass) : ON or OFF
4-way valve Y1R : On during heating operation , off during cooling or fan operation.
B
(VF026)

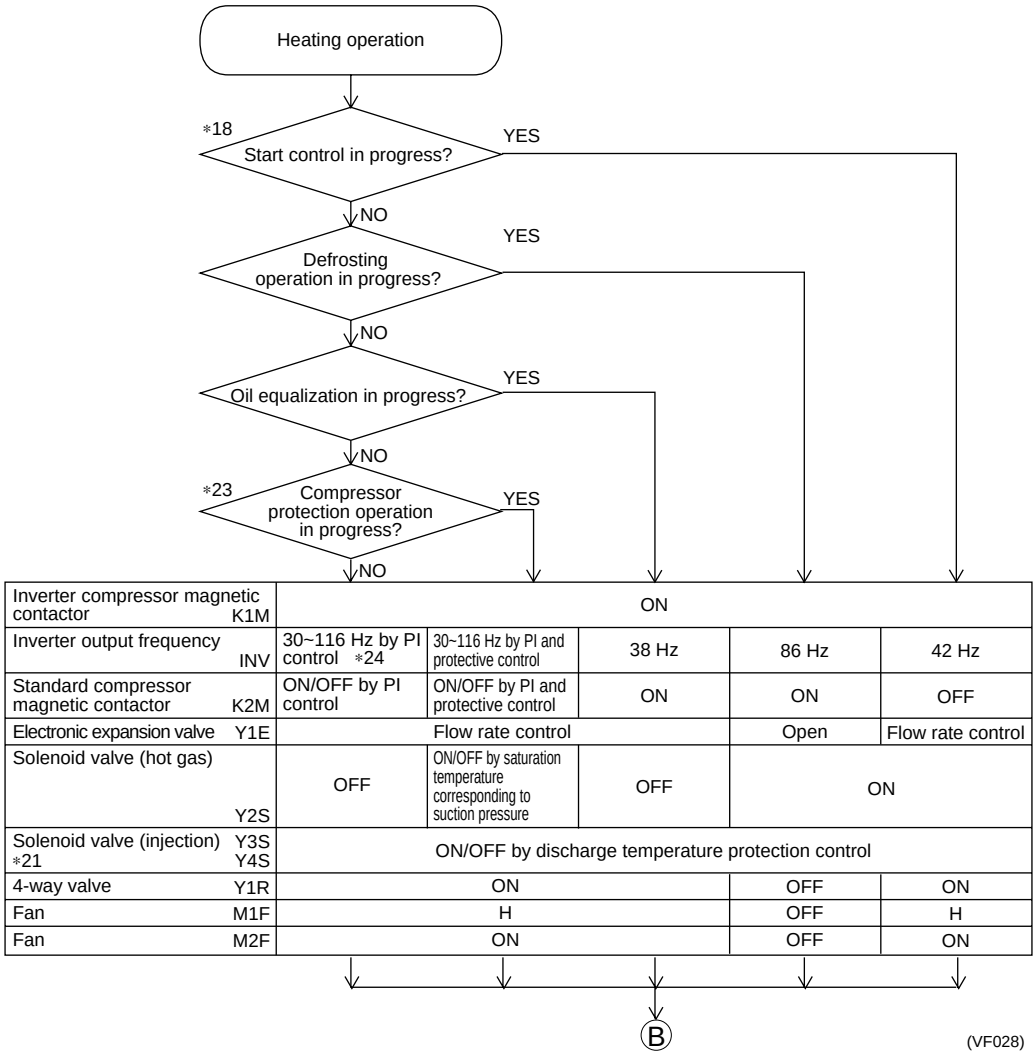
∗16 If the outdoor unit malfunction display lamp is on then this either indicates that the outdoor unit operation has been terminated abnormally or warns that there is refrigerant shortage or else that there is a piping or wiring fault (operations will continue). (Refer to Indoor Unit Control ∗1)

∗17 Keep on operations for 15 minutes after the inverter compressor has stopped.
Note: The crank case heaters (CH) are on when the magnetic relays of their respective compressors are off.



Inverter compressor magnetic contactor K1M	ON				
Inverter output frequency INV	30~116 Hz by PI control ∗20	30~116 Hz	30~116 Hz by PI and protective control	38 Hz	42 Hz
Standard compressor magnetic contactor K2M	ON/OFF by PI control	OFF	ON/OFF by PI and protective control	ON	OFF
Electronic expansion valve Y1E	Open				
Solenoid valve (hot gas) Y2S	OFF	ON/OFF by saturation temperature corresponding to suction pressure	OFF		ON
Solenoid valve (injection) ∗21 Y3S Y4S	ON/OFF by discharge temperature protection control				ON
4-way valve Y1R	OFF				
Fan M1F	H	∗22	H		
Fan M2F	ON		ON		

(VF027)

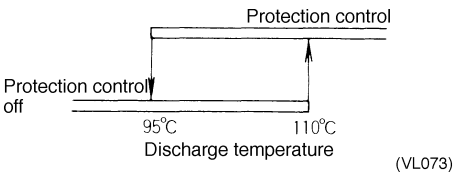


∗18 Start control

60 second start control in order to prevent liquid back to the compressor.

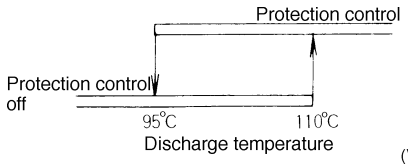
∗19 Compressor protection

1. Protection control is triggered when the cooling load is large and the saturation temperature corresponding to suction pressure is high.
2. Protection control is triggered when secondary inverter current exceeds set current.
3. Protection control is triggered by discharge temperature.
4. Protection control is triggered when saturation temperature corresponding to suction pressure is low.



∗20 PI control
Controls ON/OFF of the standard compressor and inverter output frequency so that suction pressure is the optimal value.

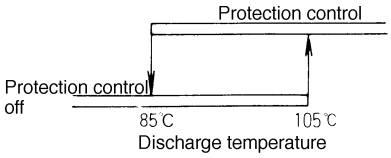
∗21 Discharge temperature protection



(VL074)

∗22 Fan control during low temperature protection
If Tc is less than 26.1°C for 30 continuous seconds, fan speed changes as follows: H + ON / H + OFF / L + OFF. When Tc becomes greater than 52.4°C, fan speed returns to H + ON.

∗23 Compressor protection
1. Protection control is triggered when secondary inverter current exceeds set current.
2. Protection control is triggered by discharge temperature.



(VL075)

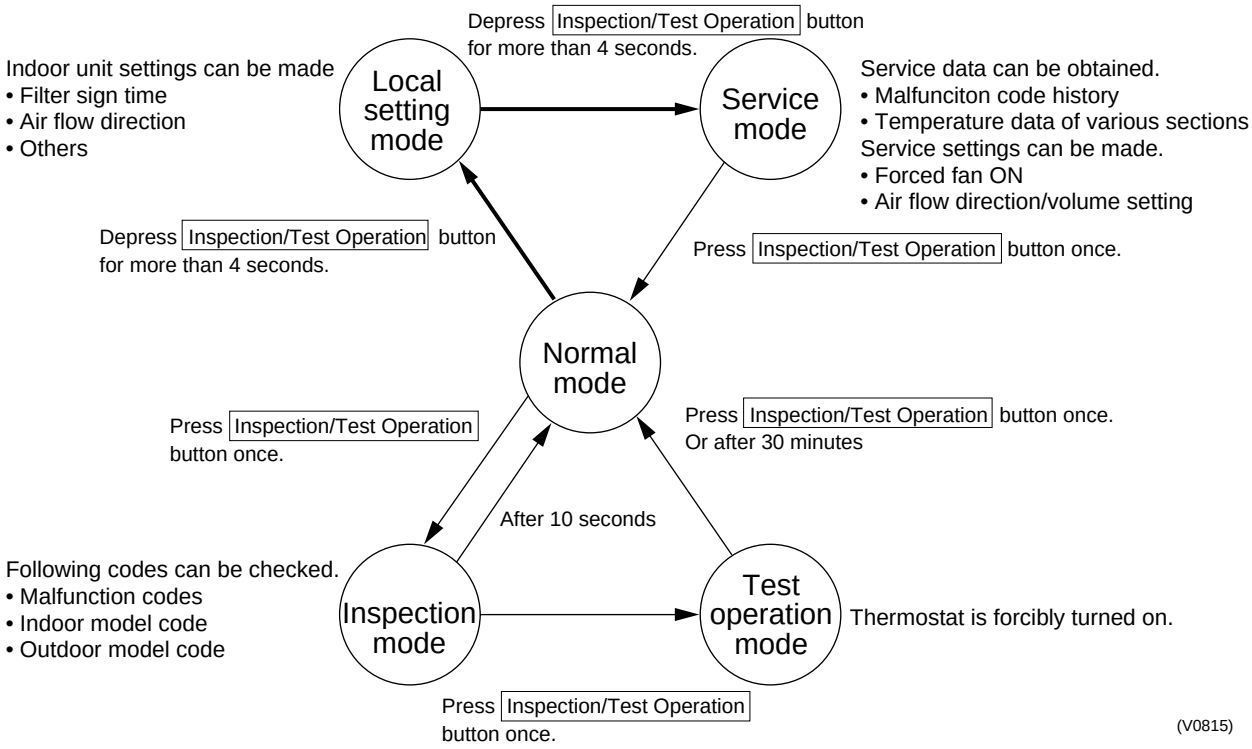
3. Protection control is triggered when the heating load is small and the saturation temperature corresponding to suction pressure is high.
4. Protection control is triggered when saturation temperature corresponding to suction pressure is low.

∗24 PI control
Controls ON/OFF of the standard compressor and inverter output frequency so that discharge pressure is the optimal value.

2. Troubleshooting by Remote Controller

2.1 The INSPECTION / TEST Button

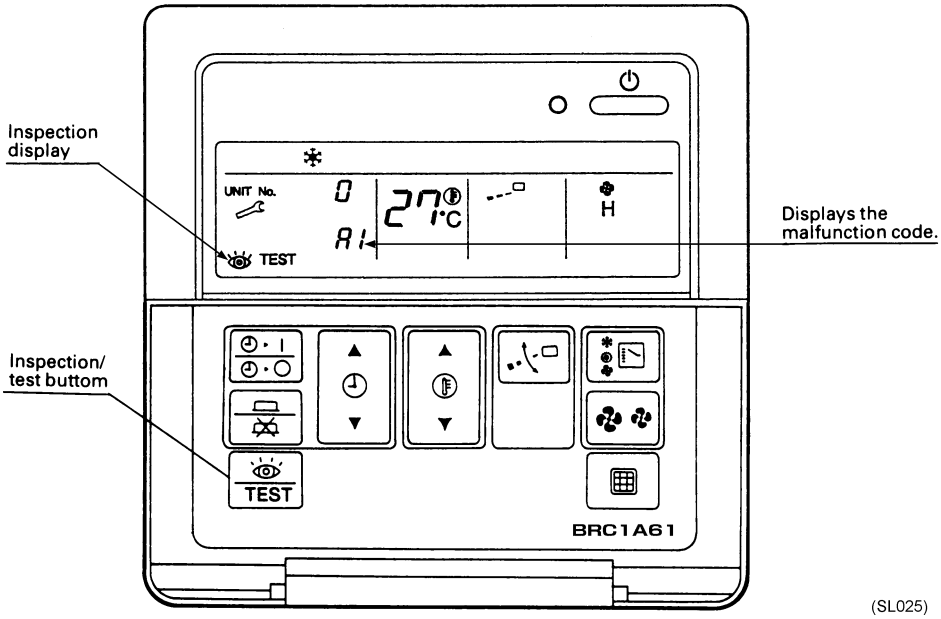
The following modes can be selected by using the [Inspection/Test Operation] button on the remote control.


Depress Inspection/Test Operation button for more than 4 seconds.
Indoor unit settings can be made
• Filter sign time
• Air flow direction
• Others
Local setting mode
Service mode
Service data can be obtained.
• Malfunciton code history
• Temperature data of various sections
Service settings can be made.
• Forced fan ON
• Air flow direction/volume setting
Depress Inspection/Test Operation button for more than 4 seconds.
Press Inspection/Test Operation button once.
Normal mode
Press Inspection/Test Operation button once.
Press Inspection/Test Operation button once.
Or after 30 minutes
After 10 seconds
Following codes can be checked.
• Malfunction codes
• Indoor model code
• Outdoor model code
Inspection mode
Test operation mode
Thermostat is forcibly turned on.
Press Inspection/Test Operation button once.
(V0815)

2.2 Self-diagnosis by Wired Remote Controller

Explanation

If operation stops due to malfunction, the remote controller's operation LED blinks, and malfunction code is displayed. (Even if stop operation is carried out, malfunction contents are displayed when the inspection mode is entered.) The malfunction code enables you to tell what kind of malfunction caused operation to stop. See page 154 for malfunction code and malfunction contents.



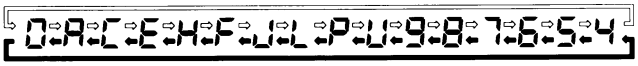
2.3 Self-diagnosis by Wireless Remote Controller

In the Case of CZ-01RW Type

If equipment stops due to a malfunction, the operation indicating LED on the light reception section flashes. The malfunction code can be determined by following the procedure described below. (The malfunction code is displayed when an operation error has occurred. In normal condition, the malfunction code of the last problem is displayed.)

1. Press the INSPECTION/TEST button to select “Inspection.”
   The equipment enters the inspection mode. The “Unit” indication lights and the Unit No. display shows flashing “0” indication.
2. Set the Unit No.
   Press the UP or DOWN button and change the Unit No. display until the buzzer (*1) is generated from the indoor unit.
   *1 Number of beeps
   3 short beeps : Conduct all of the following operations.
   1 short beep : Conduct steps 3 and 4.
   Continue the operation in step 4 until a buzzer remains ON. The continuous buzzer indicates that the malfunction code is confirmed.
   Continuous beep : No abnormality.
3. Press the MODE selector button.
   The left “0” (upper digit) indication of the malfunction code flashes.
4. Malfunction code upper digit diagnosis
   Press the UP or DOWN button and change the malfunction code upper digit until the malfunction code matching buzzer (*2) is generated.

■ The upper digit of the code changes as shown below when the UP and DOWN buttons are pressed.

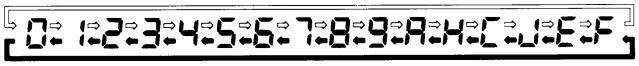


(SE006)

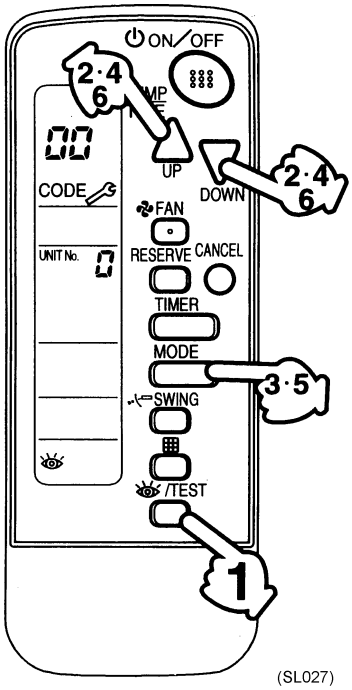
*2 Number of beeps
Continuous beep : Both upper and lower digits matched. (Malfunction code confirmed)
2 short beeps : Upper digit matched.
1 short beep : Lower digit matched.

5. Press the MODE selector button.
   The right “0” (lower digit) indication of the malfunction code flashes.
6. Malfunction code lower digit diagnosis
   Press the UP or DOWN button and change the malfunction code lower digit until the continuous malfunction code matching buzzer (*2) is generated.

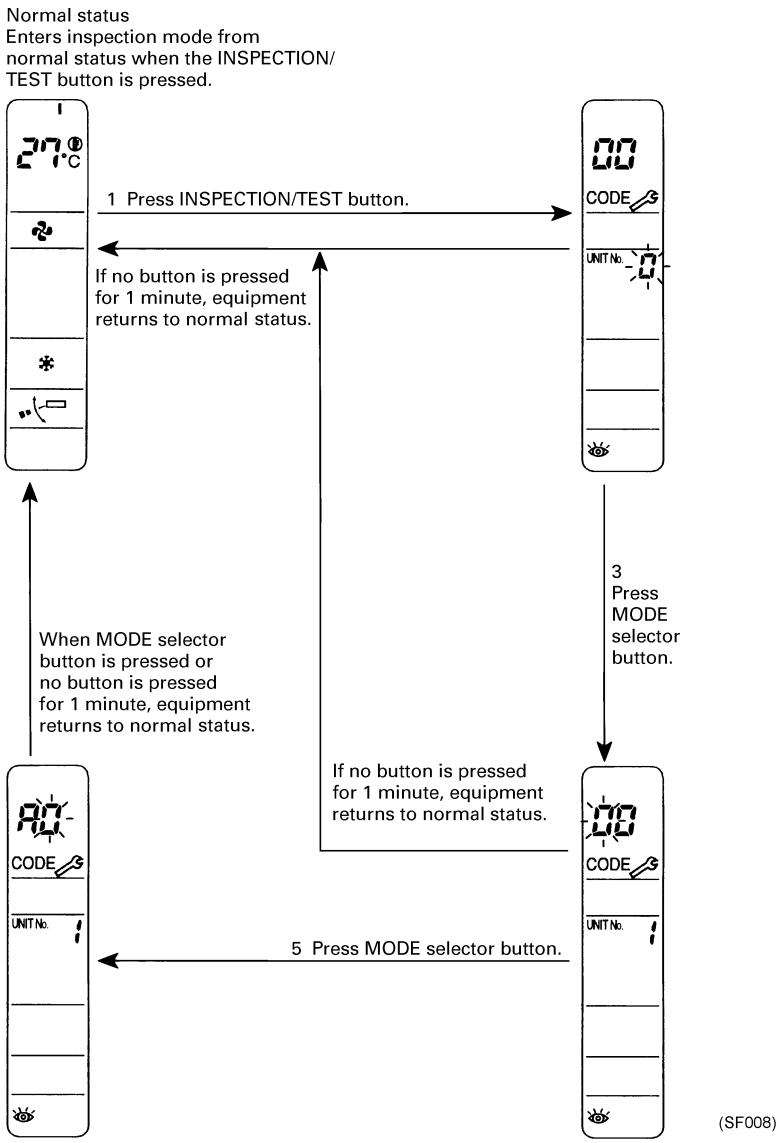
■ The lower digit of the code changes as shown below when the UP and DOWN buttons are pressed.



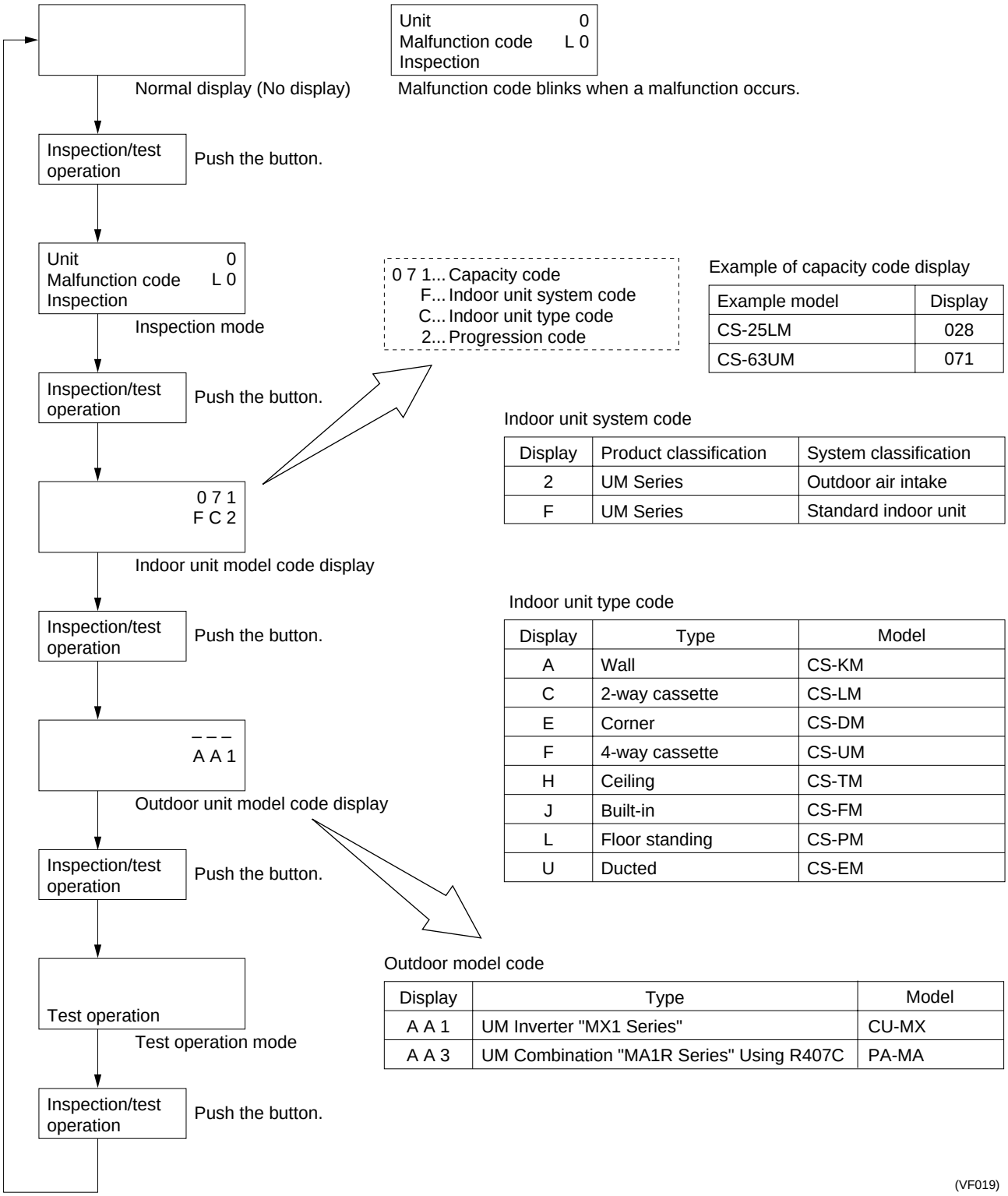
(SE007)



(SL027)


Normal status
Enters inspection mode from
normal status when the INSPECTION/
TEST button is pressed.
27°C
00
CODE
UNIT No.
0
1 Press INSPECTION/TEST button.
If no button is pressed
for 1 minute, equipment
returns to normal status.
3
Press
MODE
selector
button.
When MODE selector
button is pressed or
no button is pressed
for 1 minute, equipment
returns to normal status.
If no button is pressed
for 1 minute, equipment
returns to normal status.
A0
CODE
UNIT No.
1
00
CODE
UNIT No.
1
5 Press MODE selector button.
(SF008)

2.4 Operation of The Remote Controller's Inspection / Test Operation Button



0 7 1... Capacity code
F... Indoor unit system code
C... Indoor unit type code
2... Progression code

Example of capacity code display

Example model	Display
CS-25LM	028
CS-63UM	071

Indoor unit system code

Display	Product classification	System classification
2	UM Series	Outdoor air intake
F	UM Series	Standard indoor unit

Indoor unit type code

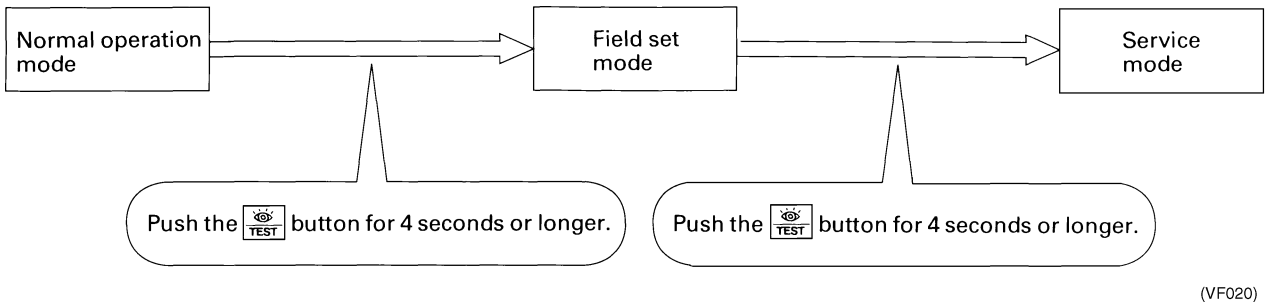
Display	Type	Model
A	Wall	CS-KM
C	2-way cassette	CS-LM
E	Corner	CS-DM
F	4-way cassette	CS-UM
H	Ceiling	CS-TM
J	Built-in	CS-FM
L	Floor standing	CS-PM
U	Ducted	CS-EM

Outdoor model code

Display	Type	Model
A A 1	UM Inverter "MX1 Series"	CU-MX
A A 3	UM Combination "MA1R Series" Using R407C	PA-MA

2.5 Remote Controller Service Mode

How to Enter the Service Mode


Normal operation mode
Field set mode
Service mode
Push the TEST button for 4 seconds or longer.
Push the TEST button for 4 seconds or longer.
(VF020)

Service Mode Operation Method

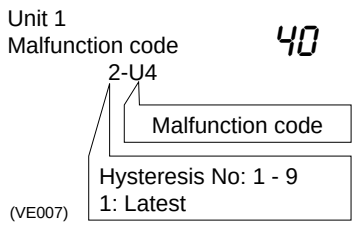
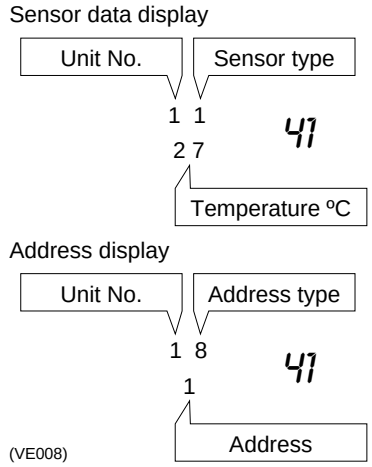
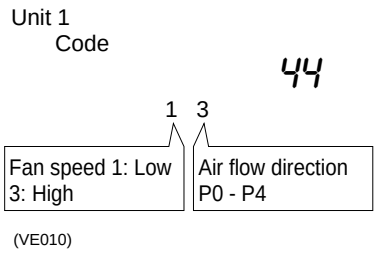
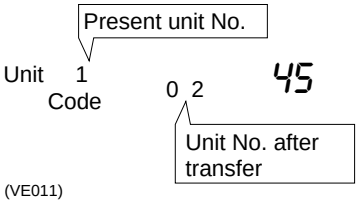
1. Select the mode No.
Set the desired mode No. with the button.
(For wireless remote controller, Mode 43 only can be set.)

2. Select the unit No. (For group control only)
Select the indoor unit No. to be set with the time mode . (For wireless remote controller, UP DOWN button.)

3. Make the settings required for each mode. (Modes 41, 44, 45)
In case of Mode 44, 45, push the timer button to be able to change setting before setting work. (LCD “code” blinks.)
For details, refer to the table in next page.

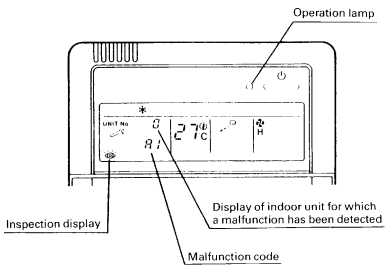
4. Define the setting contents. (Modes 44, 45)
Define by pushing the timer button.
After defining, LCD “code” changes blinking to ON.

5. Return to the normal operation mode.
Push the TEST button one time.

Mode No	Function	Contents and operation method	Remote controller display example
40	Malfunction hysteresis display	Display malfunction hysteresis. The hysteresis No. can be changed with the button.	
41	Display of sensor and address data	Display various types of data. Select the data to be displayed with the button. Sensor data 0: Thermostat sensor in remote controller. 1: Suction 2: Liquid pipe 3: Gas pipe Address data 4: Indoor unit address 5: Outdoor unit address 6: HR box address 7: Zone control address 8: Cool/heat group address 9: Demand / low noise address	
43	Forced fan ON	Manually turn the fan ON by each unit. (When you want to search for the unit No.) By selecting the unit No. with the button, you can turn the fan of each indoor unit on (forced ON) individually.	
44	Individual setting	Set the fan speed and air flow direction by each unit Select the unit No. with the time mode button. Set the fan speed with the button Set the air flow direction with the button.	
45	Unit No. transfer	Transfer unit No. Select the unit No. with the button. Set the unit No. after transfer with the button.	
46 47	This function is not used by UM “MX1R Series”.		

2.6 Remote Controller Self-Diagnosis Function (Display of Malfunction Code)

The remote controller switches are equipped with a self diagnosis function so that more appropriate maintenance can be carried out. If a malfunction occurs during operation, the operation lamp, malfunction code and display of malfunctioning unit No. let you know the contents and location of the malfunction. When there is a stop due to malfunction, the contents of the malfunction given below can be diagnosed by a combination of operation lamp, INSPECTION display of the liquid crystal display and display of malfunction code. It also lets you know the unit No. during group control.



(VL050)

Malfunction Code List

	Malfunction code	Operation lamp	Inspection display	Unit No.	Malfunction contents	Page Refered
Indoor Unit	A0	◑	◑	◑	Error of external protection device	156
	A1	◑	◑	◑	PC board defect	157
	A1	○	●	◑	PC board defect	157
	A3	◑	◑	◑	Malfunction of drain level control system (33H)	158
	A6	◑	◑	◑	Fan motor (M1F) lock, Overload	159
	A7	○	●	◑	Malfunction of swing flap motor (M1S)	160
	A9	◑	◑	◑	Malfunction of moving part of electronic expansion valve (Y1E)	161
	AF	○	●	◑	Drain level above limit	162
	AH	◑	◑	◑	Malfunction of air filter maintenance	—
	AJ	◑	◑	◑	Malfunction of capacity determination device	163
	C4	◑	◑	◑	Malfunction of thermistor (R2T) for liquid pipe (loose connection, disconnection, short circuit, failure)	164
	C5	◑	◑	◑	Malfunction of thermistor (R3T) for gas pipes (loose connection, disconnection, short circuit, failure)	165
	C9	◑	◑	◑	Malfunction of thermistor (R1T) for air inlet (loose connection, disconnection, short circuit, failure)	166
	CJ	○	○	○	Malfunction of thermostat sensor in remote controller	167
Outdoor Unit	E0	◑	◑	◑	Actuation of safety device	168
	E1	◑	◑	◑	PC board defect	169
	E1	○	●	◑	PC board defect	169
	E3	◑	◑	◑	Actuation of high pressure switch	170
	E4	◑	◑	◑	Actuation of low pressure switch	171
	E9	◑	◑	◑	Malfunction of moving part of electronic expansion valve (Y1E)	172
	F3	◑	◑	◑	Abnormal discharge pipe temperature	173
	H3	○	●	◑	High pressure switch failure	—
	H4	◑	◑	◑	Actuation of low pressure switch	—
	H9	◑	◑	◑	Malfunction of thermistor (R1T) for outdoor air (loose connection, disconnection, short circuit, failure)	174
	H9	○	●	◑	Malfunction of thermistor (R1T) for outdoor air (loose connection, disconnection, short circuit, failure)	174
	J1	◑	◑	◑	Malfunction of pressure sensor	—
	J3	◑	◑	◑	Malfunction of discharge pipe thermistor (R3T) (loose connection, disconnection, short circuit, failure)	175
	J3	○	●	◑	Malfunction of discharge pipe thermistor (R3T) (loose connection, disconnection, short circuit, failure)	175
	J5	◑	◑	◑	Malfunction of thermistor (R4T) for suction pipe (loose connection, disconnection, short circuit, failure)	176

	Malfunction code	Operation lamp	Inspection display	Unit No.	Malfunction contents	Page Refered
Outdoor Unit	J6	◑	◑	◑	Malfunction of thermistor (R2T) for heat exchanger (loose connection, disconnection, short circuit, failure)	177
	J6	○	●	◑	Malfunction of thermistor (R2T) for heat exchanger (loose connection, disconnection, short circuit, failure)	177
	JA	◑	◑	◑	Malfunction of discharge pipe pressure sensor	178
	JC	◑	◑	◑	Malfunction of suction pipe pressure sensor	179
	JH	○	●	◑	Malfunction of oil temperature thermistor (R5T)	180
	L0	◑	◑	◑	Failure of inverter system	—
	L4	◑	◑	◑	Malfunction of inverter radiating fin temperature rise	194
	L5	◑	◑	◑	Inverter instantaneous over-current	195
	L6	◑	◑	◑	Compressor motor insulation defect, short circuit	—
	L8	◑	◑	◑	Inverter thermostat sensor, Compressor overload	196
	L9	◑	◑	◑	Inverter stall prevention, Compressor lock	197
	LA	◑	◑	◑	Malfunction of power unit	—
	LC	◑	◑	◑	Malfunction of transmission between inverter and control PC board	198
System	P0	◑	●	◑	Gas depletion (heat build up)	—
	P1	◑	◑	◑	Inverter over-ripple protection	200
	P4	◑	◑	◑	Malfunction of inverter radiating fin temperature rise sensor	201
	U0	○	●	◑	Low pressure drop due to refrigerant shortage or electronic expansion valve failure	181
	U1	◑	◑	◑	Negative phase / open phase	182
	U2	◑	◑	◑	Power supply insufficient or instantaneous failure	199
	U4	◑	◑	◑	Malfunction of transmission between indoor units	183
	U5	◑	◑	◑	Malfunction of transmission between remote controller and indoor unit	184
	U5	●	○	●	Failure of remote controller PC board or setting during control by remote controller	—
	U7	◑	◑	◑	Malfunction of transmission between indoor units Malfunction of transmission between outdoor units, malfunction of transmission between outdoor unit and ice build-up heat unit	—
	U7	○	●	◑	Malfunction of transmission between outdoor units (cool/ heat unified, low noise)	185
	U8	◑	◑	●	Malfunction of transmission between master and slave remote controllers (malfunction of slave remote controller)	186
	U9	◑	◑	◑	Malfunction of transmission between indoor and outdoor units in the same system	187
	UA	◑	◑	◑	Excessive number of indoor units	188
	UC	○	○	○	Address duplication of central remote controller	189
	UE	◑	◑	◑	Malfunction of transmission between central remote controller and indoor unit	202
	UF	◑	◑	◑	Refrigerant system not set, incompatible wiring / piping	190
	UH	◑	◑	◑	Malfunction of system, refrigerant system address undefined	191
Centralized Control and Schedule Timer	UE	◑	◑	◑	Malfunction of transmission between central remote controller and indoor unit	202 207
	M1	○ or ◑	◑	◑	PC board defect	203 208
	M8	○ or ◑	◑	◑	Malfunction of transmission between optional controllers for centralised control	204 209
	MA	○ or ◑	◑	◑	Improper combination of optional controllers for centralised control	205 210
	MC	○ or ◑	◑	◑	Address duplication, improper setting	206 211

In case of the malfunction with the shaded error code, the unit still operates. However, be sure to have it inspected and repaired and as soon as possible.

3. Troubleshooting

3.1 Indoor Unit: Error of External Protection Device

Remote Controller Display

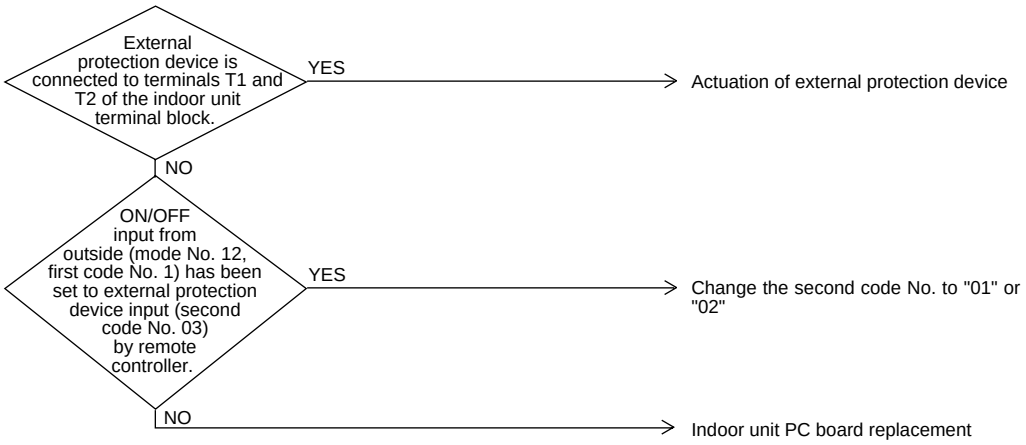
A0

Supposed Causes

- Actuation of external protection device
- Improper field set
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


External protection device is connected to terminals T1 and T2 of the indoor unit terminal block.
YES
Actuation of external protection device
NO
ON/OFF input from outside (mode No. 12, first code No. 1) has been set to external protection device input (second code No. 03) by remote controller.
YES
Change the second code No. to "01" or "02"
NO
Indoor unit PC board replacement

(VF029)

3.2 Indoor Unit: PC Board Defect

Remote Controller Display	A1
Supposed Causes	■ Defect of indoor unit PC board
Troubleshooting	Replace the indoor unit PC board.

3.3 Indoor Unit: Malfunction of Drain Level Control System (33H)

Remote Controller Display

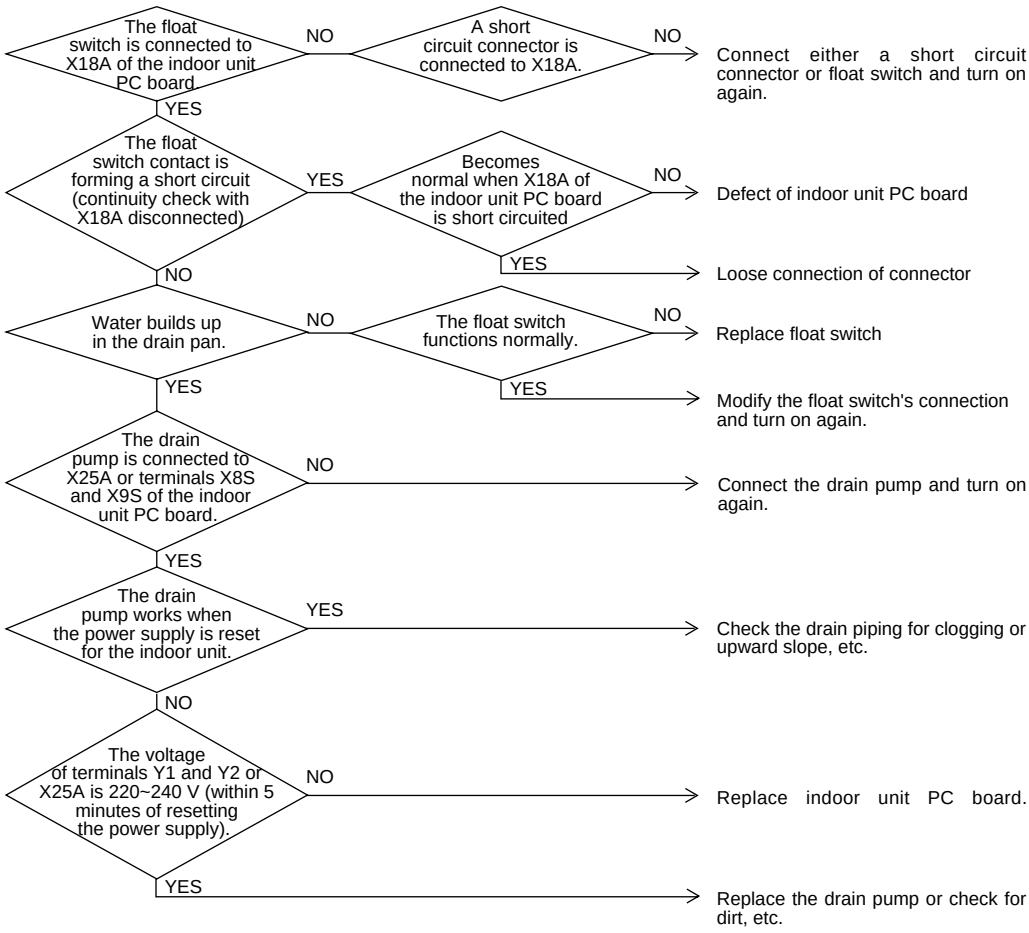
A3

Supposed Causes

- Defect of float switch or short circuit connector
- Defect of drain pump
- Drain clogging, upward slope, etc.
- Defect of indoor unit PC board
- Loose connection of connector

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The float switch is connected to X18A of the indoor unit PC board
NO
A short circuit connector is connected to X18A.
NO
Connect either a short circuit connector or float switch and turn on again.
YES
The float switch contact is forming a short circuit (continuity check with X18A disconnected)
YES
Becomes normal when X18A of the indoor unit PC board is short circuited
NO
Defect of indoor unit PC board
YES
Loose connection of connector
NO
Water builds up in the drain pan.
NO
The float switch functions normally.
NO
Replace float switch
YES
Modify the float switch's connection and turn on again.
YES
The drain pump is connected to X25A or terminals X8S and X9S of the indoor unit PC board.
NO
Connect the drain pump and turn on again.
YES
The drain pump works when the power supply is reset for the indoor unit.
YES
Check the drain piping for clogging or upward slope, etc.
NO
The voltage of terminals Y1 and Y2 or X25A is 220~240 V (within 5 minutes of resetting the power supply).
NO
Replace indoor unit PC board.
YES
Replace the drain pump or check for dirt, etc.

(VF030)

3.4 Indoor Unit: Fan Motor (M1F) Lock, Overload

Remote Controller Display

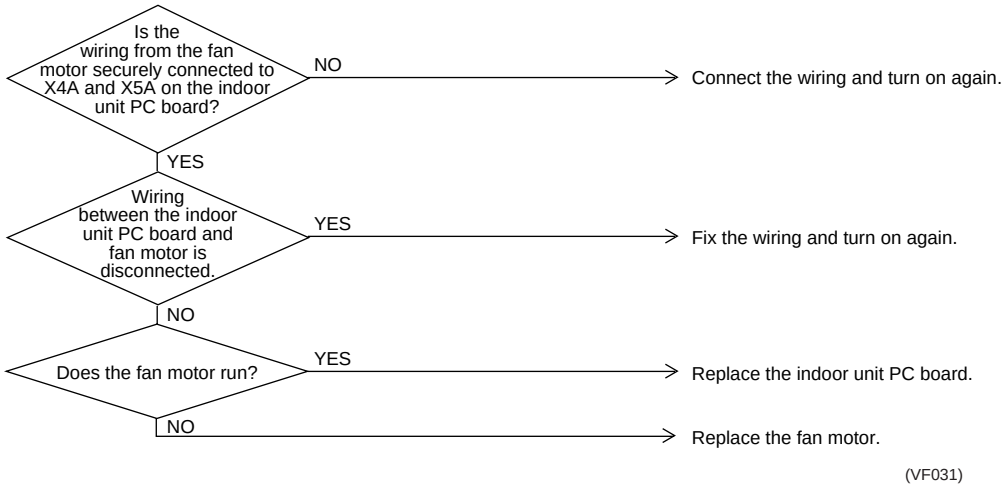
A6

Supposed Causes

- Fan motor lock
- Disconnected or faulty wiring between fan motor and PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is the wiring from the fan motor securely connected to X4A and X5A on the indoor unit PC board?
NO
Connect the wiring and turn on again.
YES
Wiring between the indoor unit PC board and fan motor is disconnected.
YES
Fix the wiring and turn on again.
NO
Does the fan motor run?
YES
Replace the indoor unit PC board.
NO
Replace the fan motor.

(VF031)

3.5 Indoor Unit: Malfunction of Swing Flap Motor (M1S)

Remote Controller Display

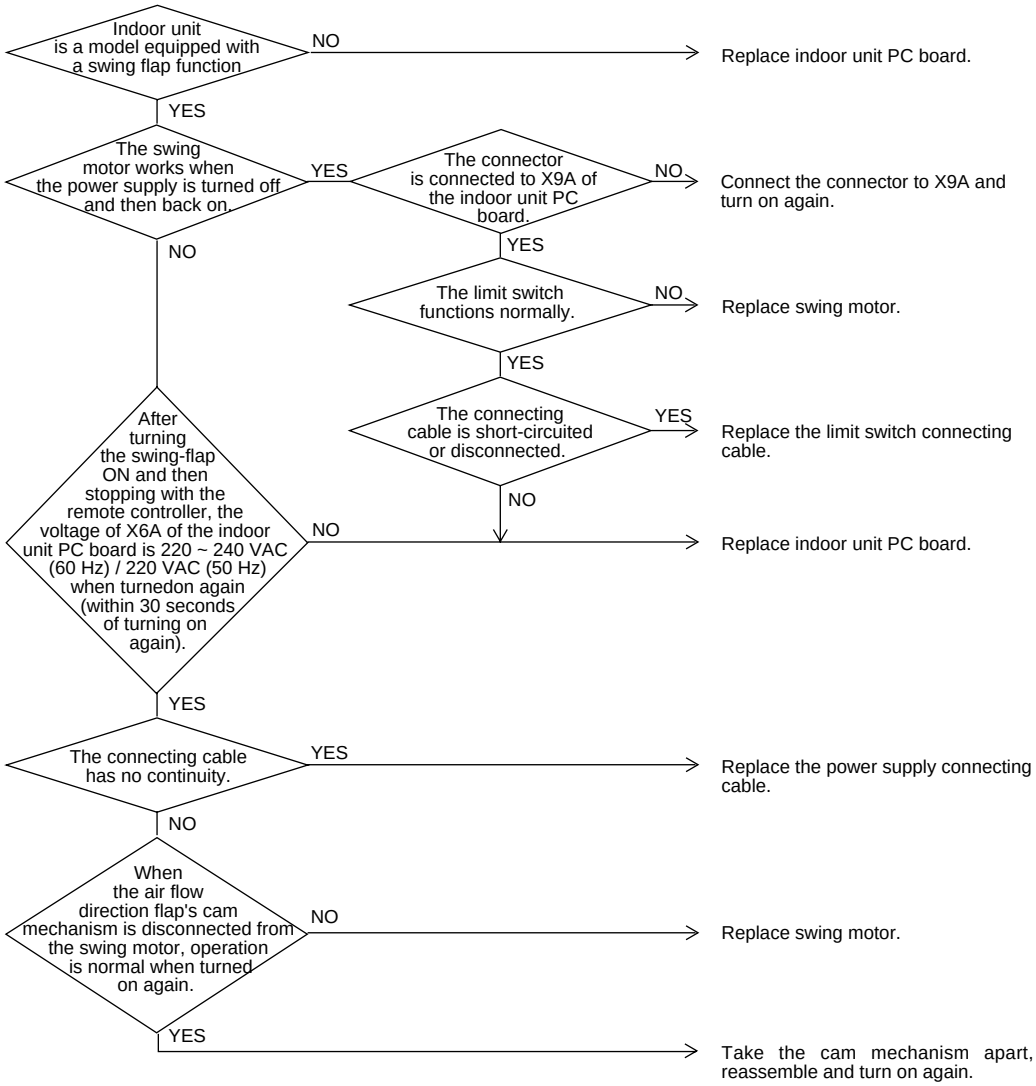
A7

Supposed Causes

- Defect of swing motor
- Defect of connection cable (power supply and limit switch)
- Defect of air flow direction adjusting flap-cam
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Indoor unit is a model equipped with a swing flap function
NO
Replace indoor unit PC board.
YES
The swing motor works when the power supply is turned off and then back on.
YES
The connector is connected to X9A of the indoor unit PC board.
NO
Connect the connector to X9A and turn on again.
YES
NO
The limit switch functions normally.
NO
Replace swing motor.
YES
The connecting cable is short-circuited or disconnected.
YES
Replace the limit switch connecting cable.
NO
After turning the swing-flap ON and then stopping with the remote controller, the voltage of X6A of the indoor unit PC board is 220 ~ 240 VAC (60 Hz) / 220 VAC (50 Hz) when turnedon again (within 30 seconds of turning on again).
NO
Replace indoor unit PC board.
YES
The connecting cable has no continuity.
YES
Replace the power supply connecting cable.
NO
When the air flow direction flap's cam mechanism is disconnected from the swing motor, operation is normal when turned on again.
NO
Replace swing motor.
YES
Take the cam mechanism apart, reassemble and turn on again.

(VF032)

3.6 Indoor Unit: Malfunction of Moving Part of Electronic Expansion Valve (Y1E)

Remote Controller Display

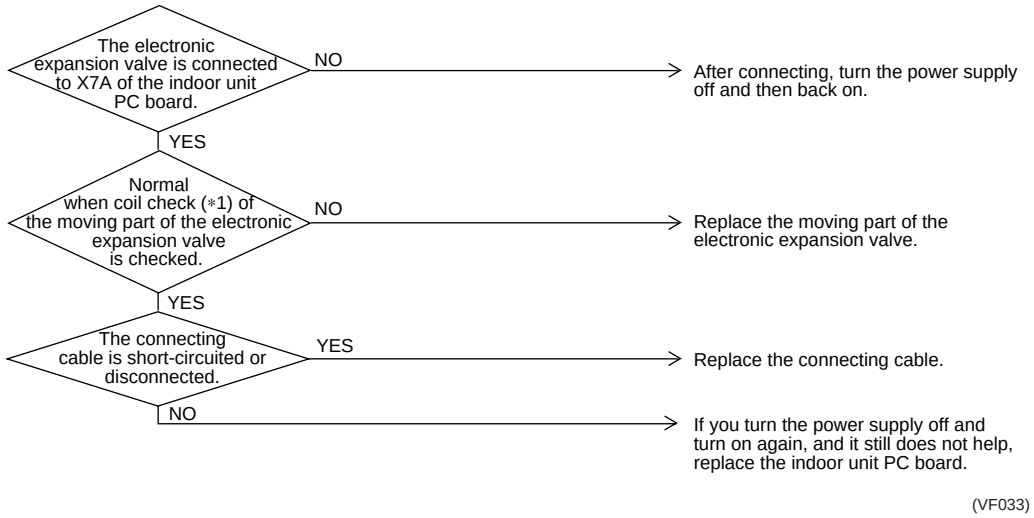
A9

Supposed Causes

- Malfunction of moving part of electronic expansion valve
- Defect of indoor unit PC board
- Defect of connecting cable

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The electronic expansion valve is connected to X7A of the indoor unit PC board.
NO
After connecting, turn the power supply off and then back on.
YES
Normal when coil check (*1) of the moving part of the electronic expansion valve is checked.
NO
Replace the moving part of the electronic expansion valve.
YES
The connecting cable is short-circuited or disconnected.
YES
Replace the connecting cable.
NO
If you turn the power supply off and turn on again, and it still does not help, replace the indoor unit PC board.

(VF033)

*1: Coil check method for the moving part of the electronic expansion valve.
Disconnect electronic expansion valve from P.C.B, then check the continuity between connector pins and judge.

(Normal)

Pin No.	1. White	2. Yellow	3. Orange	4. Blue	5. Red	6. Brown
1. White		×	○ Approx. 300Ω	×	○ Approx. 150Ω	×
2. Yellow			×	○ Approx. 300Ω	×	○ Approx. 150Ω
3. Orange				×	○ Approx. 150Ω	×
4. Blue					×	○ Approx. 150Ω
5. Red						×
6. Brown						

○: Continuity
×: No continuity

3.7 Indoor Unit: Drain Level above Limit

Remote Controller Display

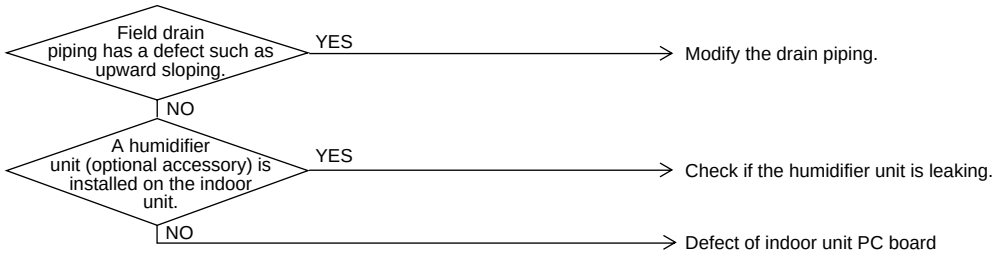
AF

Supposed Causes

- Humidifier unit (optional accessory) leaking
- Defect of drain pipe (upward slope, etc.)
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Field drain piping has a defect such as upward sloping.
YES
Modify the drain piping.
NO
A humidifier unit (optional accessory) is installed on the indoor unit.
YES
Check if the humidifier unit is leaking.
NO
Defect of indoor unit PC board

(VF034)

3.8 Indoor Unit: Malfunction of Capacity Determination Device

Remote controller display

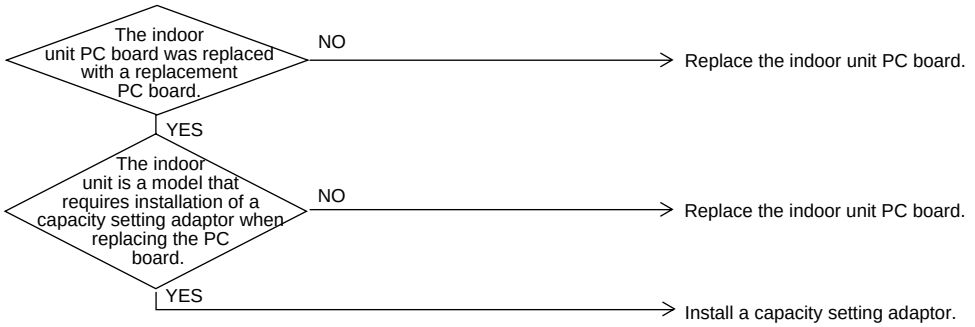
AJ

Supposed Causes

- You have forgotten to install the capacity setting adaptor.
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The indoor unit PC board was replaced with a replacement PC board.
NO
Replace the indoor unit PC board.
YES
The indoor unit is a model that requires installation of a capacity setting adaptor when replacing the PC board.
NO
Replace the indoor unit PC board.
YES
Install a capacity setting adaptor.

(VF035)

3.9 Indoor Unit: Malfunction of Thermistor (R2T) for Liquid Pipe

Remote Controller Display

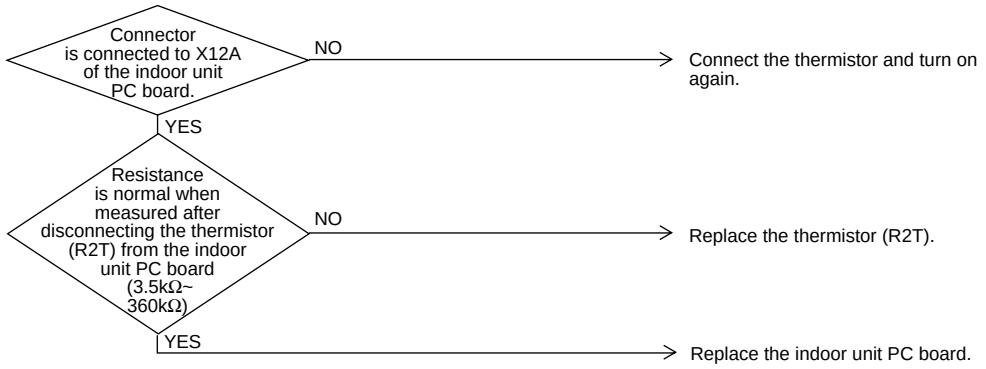
C4

Supposed Causes

- Defect of thermistor (R2T) for liquid pipe
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X12A of the indoor unit PC board.
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R2T) from the indoor unit PC board (3.5kΩ~ 360kΩ)
NO
Replace the thermistor (R2T).
YES
Replace the indoor unit PC board.

(VF036)

3.10 Indoor Unit: Malfunction of Thermistor (R3T) for Gas Pipes

Remote Controller Display

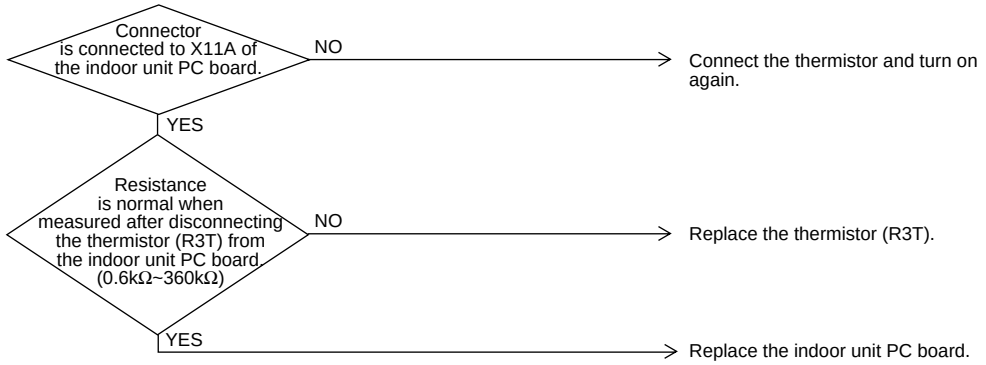
C5

Supposed Causes

- Defect of indoor unit thermistor (R3T) for gas pipe
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X11A of the indoor unit PC board.
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R3T) from the indoor unit PC board. (0.6kΩ~360kΩ)
NO
Replace the thermistor (R3T).
YES
Replace the indoor unit PC board.

(VF037)

3.11 Indoor Unit: Malfunction of Thermistor (R1T) for Air Inlet

Remote Controller Display

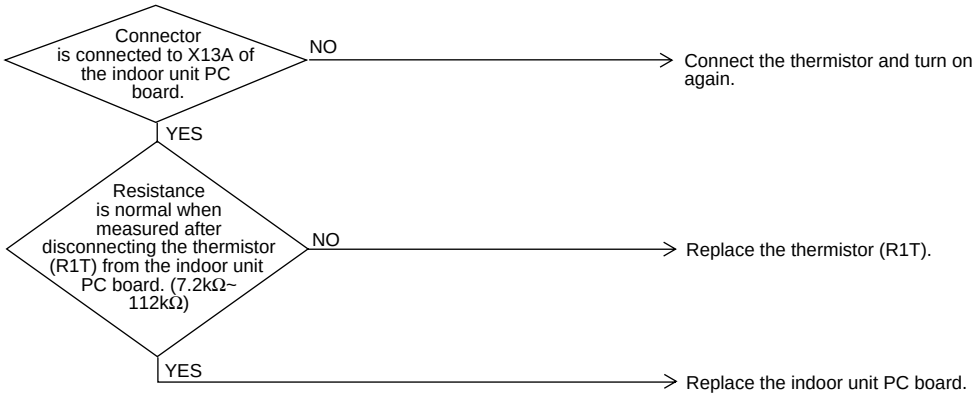
C9

Supposed Causes

- Defect of indoor unit thermistor (R1T) for air inlet
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X13A of the indoor unit PC board.
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R1T) from the indoor unit PC board. (7.2kΩ~ 112kΩ)
NO
Replace the thermistor (R1T).
YES
Replace the indoor unit PC board.

(VF038)

3.12 Indoor Unit: Malfunction of Thermostat Sensor in Remote Controller

Remote Controller Display

CJ

Supposed Causes

- Defect of remote controller thermistor
- Defect of remote controller PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

Turn power supply OFF, then power ON again.
Is "CJ" displayed on the remote controller?
YES
Replace remote controller.
NO
External factor other than equipment malfunction. (for example, noise etc.)
(VF039)

3.13 Outdoor Unit: Actuation of Safety Device

Remote Controller Display

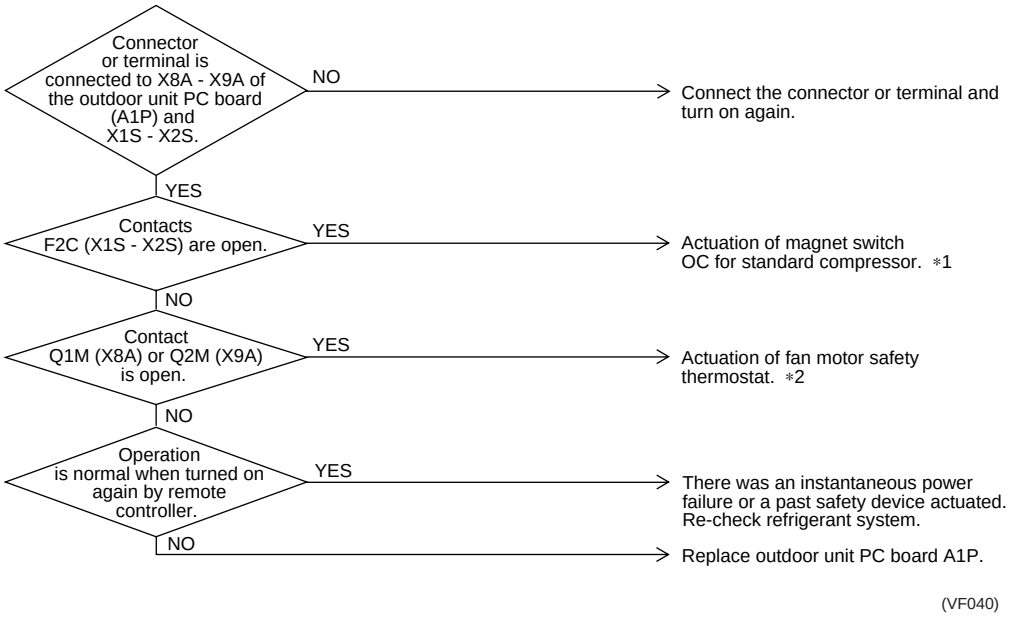
E0

Supposed Causes

- Actuation of outdoor unit safety device
- Defect of outdoor unit PC board
- Instantaneous power failure

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector or terminal is connected to X8A - X9A of the outdoor unit PC board (A1P) and X1S - X2S.
NO
Connect the connector or terminal and turn on again.
YES
Contacts F2C (X1S - X2S) are open.
YES
Actuation of magnet switch OC for standard compressor. ∗1
NO
Contact Q1M (X8A) or Q2M (X9A) is open.
YES
Actuation of fan motor safety thermostat. ∗2
NO
Operation is normal when turned on again by remote controller.
YES
There was an instantaneous power failure or a past safety device actuated. Re-check refrigerant system.
NO
Replace outdoor unit PC board A1P.

(VF040)

∗1: Actuation of magnet switch OC
Defect of compressor
Power supply insufficient
Defect of magnet switch, etc.

∗2: Actuation of fan motor safety thermostat
Defect of fan motor
Defect of capacitor, etc.

3.14 Outdoor Unit: PC Board Defect

Remote Controller Display	E1
Supposed Causes	■ Defect of outdoor unit PC board (A1P)
Troubleshooting	Replace outdoor unit PC board A1P.

3.15 Outdoor Unit: Actuation of High Pressure Switch

Remote Controller Display

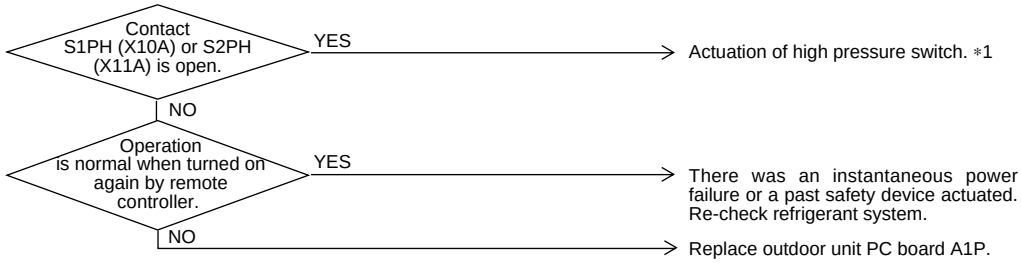
E3

Supposed Causes

- Actuation of outdoor unit high pressure switch
- Defect of outdoor unit PC board (A1P)
- Instantaneous power failure

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Contact S1PH (X10A) or S2PH (X11A) is open.
YES
Actuation of high pressure switch. ∗1
NO
Operation is normal when turned on again by remote controller.
YES
There was an instantaneous power failure or a past safety device actuated. Re-check refrigerant system.
NO
Replace outdoor unit PC board A1P.

(VF041)

∗1: Actuation of high pressure switch (HPS)
The outdoor unit PC board's connector is disconnected.
Is the outdoor unit heat exchanger dirty?
Defect of outdoor fan
Is the refrigerant over-charged?

3.16 Outdoor Unit: Actuation of Low Pressure Switch

Remote Controller Display

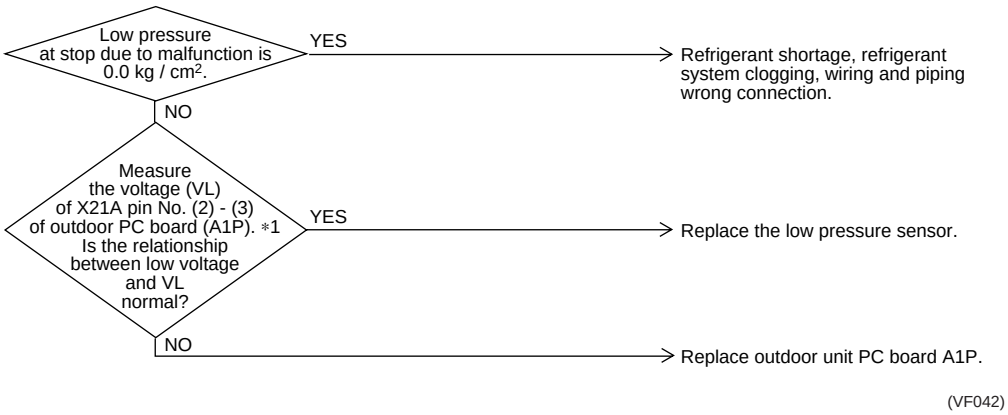
E4

Supposed Causes

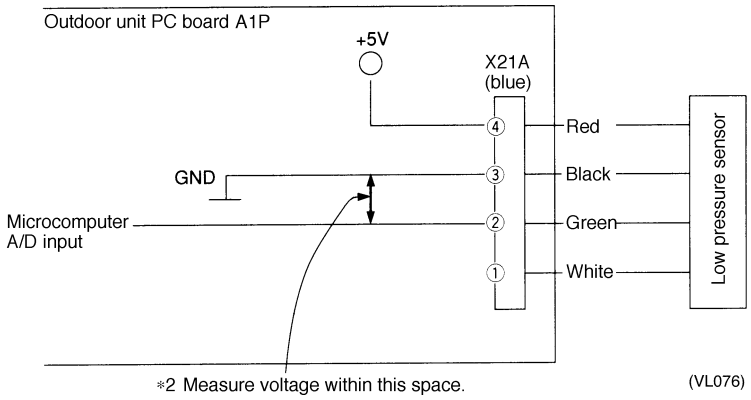
- Abnormal drop of low pressure (0 kg/cm² [0 MPa])
- Defect of low pressure sensor
- Defect of outdoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Low pressure at stop due to malfunction is 0.0 kg / cm².
YES
Refrigerant shortage, refrigerant system clogging, wiring and piping wrong connection.
NO
Measure the voltage (VL) of X21A pin No. (2) - (3) of outdoor PC board (A1P). ∗1 Is the relationship between low voltage and VL normal?
YES
Replace the low pressure sensor.
NO
Replace outdoor unit PC board A1P.
(VF042)

∗1: Voltage measurement point



∗2: Refer to pressure sensor, pressure - voltage characteristics table on P587.

3.17 Outdoor Unit: Malfunction of Moving Part of Electronic Expansion Valve (Y1E)

Remote Controller Display

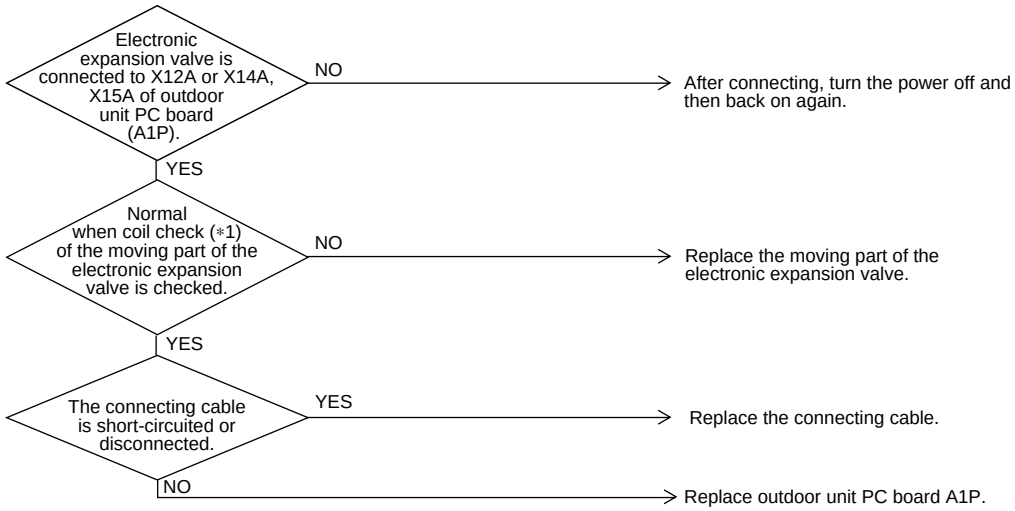
E9

Supposed Causes

- Defect of moving part of electronic expansion valve
- Defect of outdoor unit PC board (A1P)
- Defect of connecting cable

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Electronic expansion valve is connected to X12A or X14A, X15A of outdoor unit PC board (A1P).
NO
After connecting, turn the power off and then back on again.
YES
Normal when coil check (∗1) of the moving part of the electronic expansion valve is checked.
NO
Replace the moving part of the electronic expansion valve.
YES
The connecting cable is short-circuited or disconnected.
YES
Replace the connecting cable.
NO
Replace outdoor unit PC board A1P.

(VF043)

∗1 Coil check method for the moving part of the electronic expansion valve
Disconnect the electronic expansion valve from the PC board and check the continuity between the connector pins.

(Normal)

Pin No.	1. White	2. Yellow	3. Orange	4. Blue	5. Red	6. Brown
1. White		×	◎	×	○	×
2. Yellow			×	◎	×	○
3. Orange				×	○	×
4. Blue					×	○
5. Red						×
6. Brown						

◎: Continuity Approx. 300Ω
○: Continuity Approx. 150Ω
×: No continuity

Note: MX1 Series ... X12A
ME1 Series ... X14A, X15A

3.18 Outdoor Unit: Abnormal Discharge Pipe Temperature

Remote Controller Display

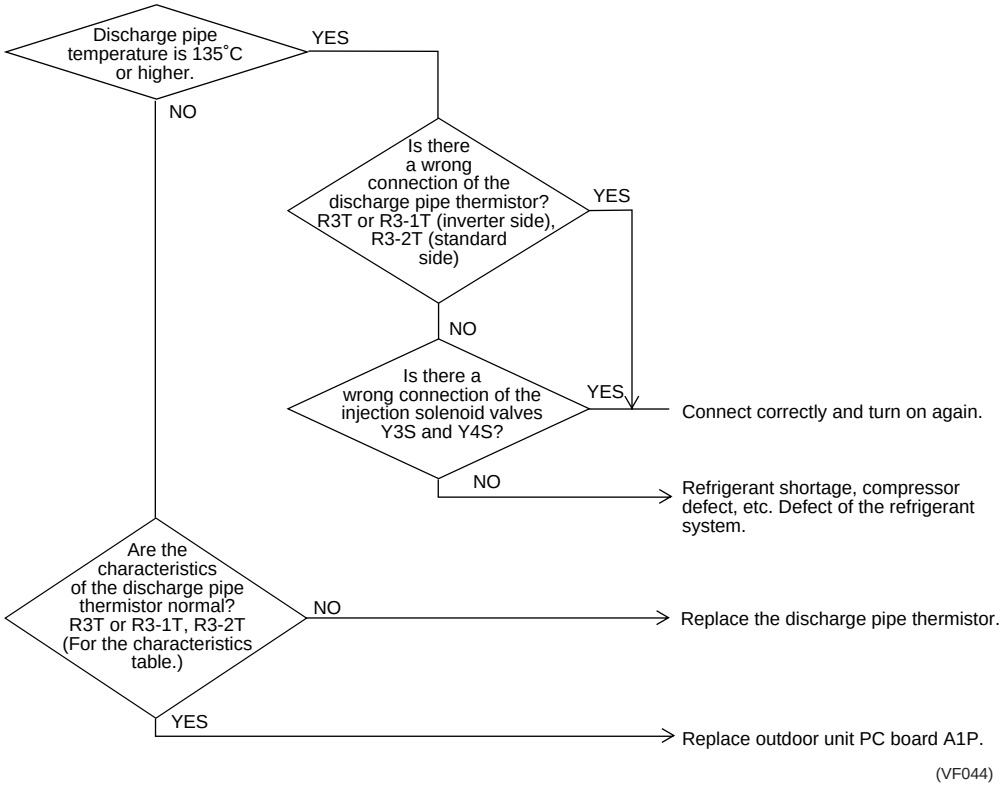
F3

Supposed Causes

- Abnormal discharge pipe temperature
- Defect of discharge pipe thermistor (CU-5 : R3T CU-8·10 : R3-1T, R3-2T)
- Defect of outdoor unit PC board
- Discharge pipe thermistor wrong connection
- Liquid injection solenoid valve wrong connection

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Discharge pipe temperature is 135˚C or higher.
YES
NO
Is there a wrong connection of the discharge pipe thermistor? R3T or R3-1T (inverter side), R3-2T (standard side)
YES
NO
Is there a wrong connection of the injection solenoid valves Y3S and Y4S?
YES
Connect correctly and turn on again.
NO
Refrigerant shortage, compressor defect, etc. Defect of the refrigerant system.
Are the characteristics of the discharge pipe thermistor normal? R3T or R3-1T, R3-2T (For the characteristics table.)
NO
Replace the discharge pipe thermistor.
YES
Replace outdoor unit PC board A1P.

(VF044)

Note:

	CU-5	CU-8·10	
	R3T	R3-1T (Inverter)	R3-2T (Standard)
MX1	X17A	X17A	X18A
ME1	–	X16A	X17A

3.19 Outdoor Unit: Malfunction of Thermistor (R1T) for Outdoor Air

Remote Controller Display

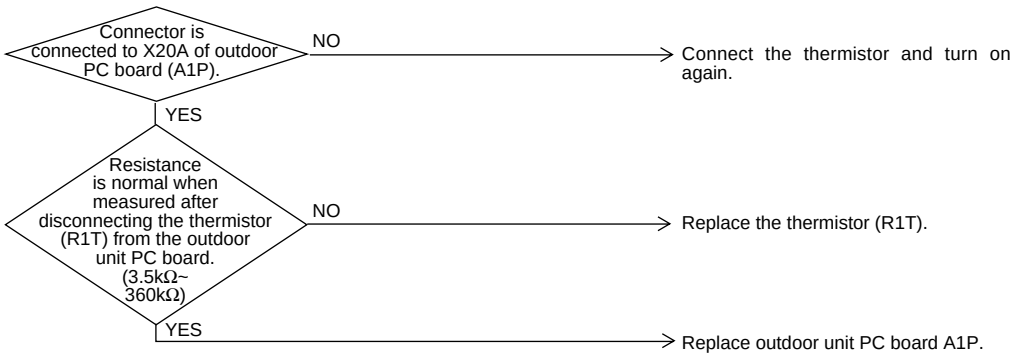
H9

Supposed Causes

- Defect of thermistor (R1T) for outdoor unit outdoor air intake
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X20A of outdoor PC board (A1P).
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R1T) from the outdoor unit PC board. (3.5kΩ~ 360kΩ)
NO
Replace the thermistor (R1T).
YES
Replace outdoor unit PC board A1P.

(VF045)

The alarm indicator is displayed when the fan is being used also.

3.20 Outdoor Unit: Malfunction of Discharge Pipe Thermistor (R3T)

Remote Controller Display

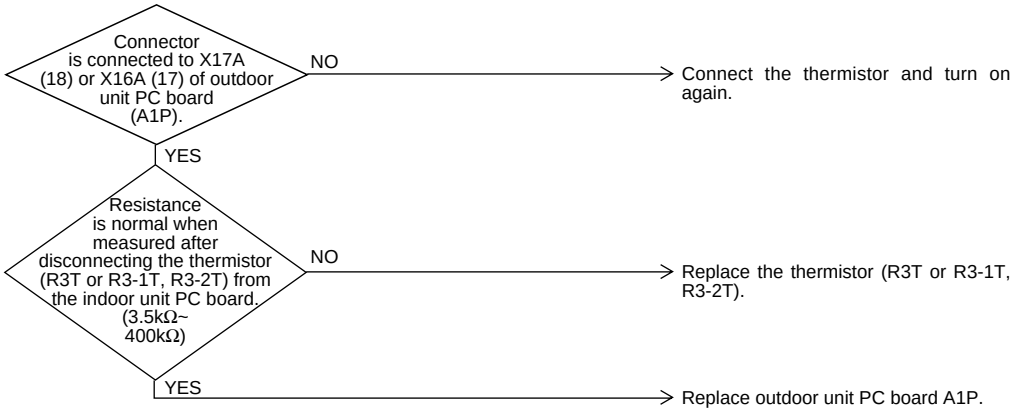
J3

Supposed Causes

- Defect of thermistor (CU-5 : R3T, CU-8·10 : R3-1T, R3-2T) for outdoor unit discharge pipe
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X17A (18) or X16A (17) of outdoor unit PC board (A1P).
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R3T or R3-1T, R3-2T) from the indoor unit PC board. (3.5kΩ~ 400kΩ)
NO
Replace the thermistor (R3T or R3-1T, R3-2T).
YES
Replace outdoor unit PC board A1P.

(VF046)

The alarm indicator is displayed when the fan is being used also.

Note:

	CU-5	CU-8·10	
	R3T	R3-1T (Inverter)	R3-2T (Standard)
MX1	X17A	X17A	X18A
ME1	–	X16A	X17A

3.21 Outdoor Unit: Malfunction of Thermistor (R4T) for Suction Pipe

Remote Controller Display

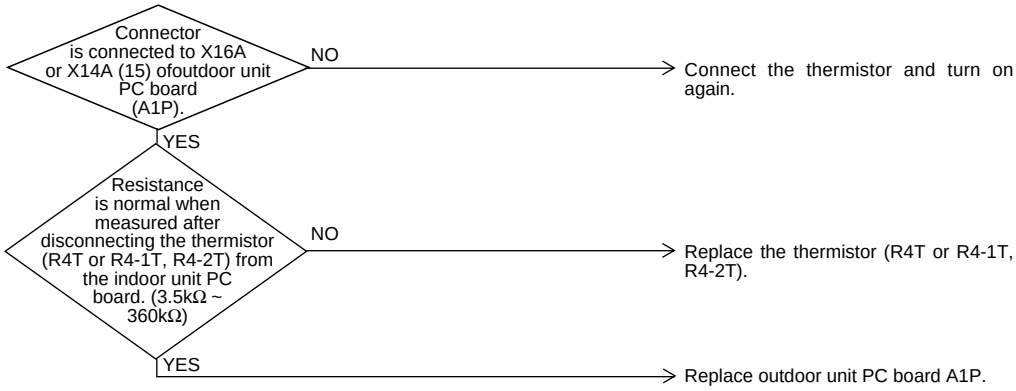
J5

Supposed Causes

- Defect of thermistor (R4T or R4-1T, R4-2T) for outdoor unit suction pipe
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X16A or X14A (15) ofoutdoor unit PC board (A1P).
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R4T or R4-1T, R4-2T) from the indoor unit PC board. (3.5kΩ ~ 360kΩ)
NO
Replace the thermistor (R4T or R4-1T, R4-2T).
YES
Replace outdoor unit PC board A1P.

(VF047)

The alarm indicator is displayed when the fan is being used also.

Note: MX1 Series
R4T ↔ X16A
ME1 Series
R4-1T ↔ X14A
R4-2T ↔ X15A

3.22 Outdoor Unit: Malfunction of Thermistor (R2T) for Heat Exchanger

Remote Controller Display

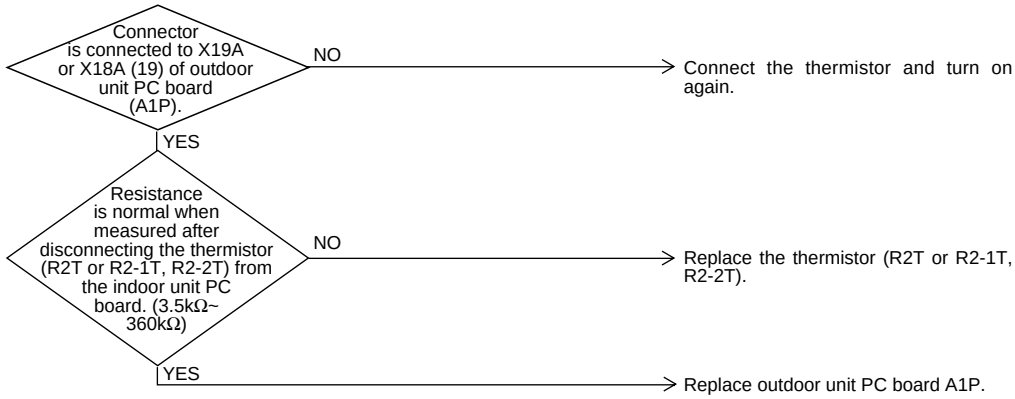
J6

Supposed Causes

- Defect of thermistor (R2T or R2-1T, R2-2T) for outdoor unit coil
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X19A or X18A (19) of outdoor unit PC board (A1P).
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R2T or R2-1T, R2-2T) from the indoor unit PC board. (3.5kΩ~ 360kΩ)
NO
Replace the thermistor (R2T or R2-1T, R2-2T).
YES
Replace outdoor unit PC board A1P.

(VF048)

The alarm indicator is displayed when the fan is being used also.

Note: MX1 Series
R2T ↔ X19A
ME1 Series
R2-1T ↔ X18A
R2-2T ↔ X19A

3.23 Outdoor Unit: Malfunction of Discharge Pipe Pressure Sensor

Remote Controller Display

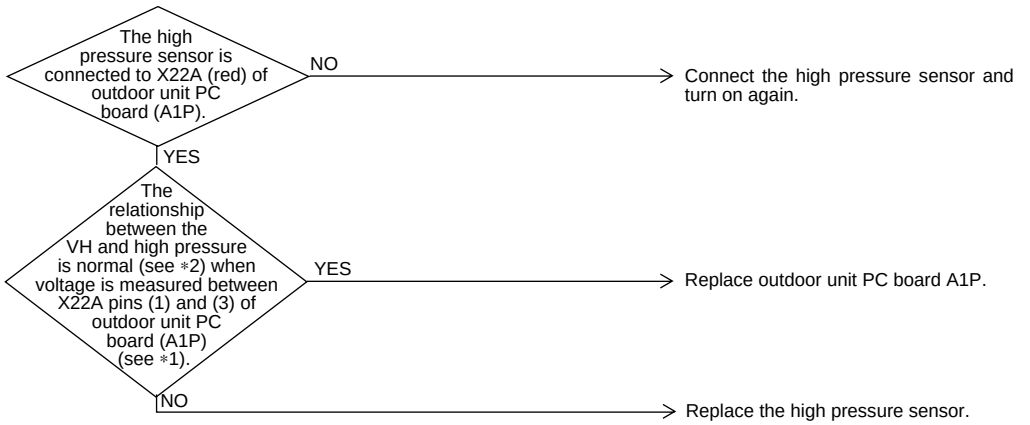
JA

Supposed Causes

- Defect of high pressure sensor system
- Connection of low pressure sensor with wrong connection.
- Defect of outdoor unit PC board.

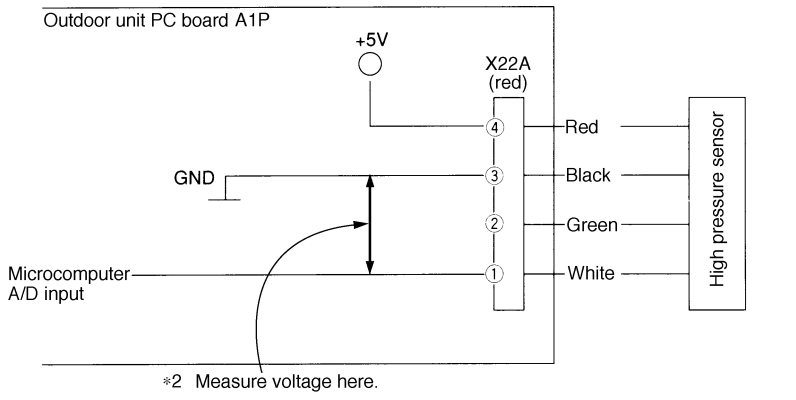
Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The high pressure sensor is connected to X22A (red) of outdoor unit PC board (A1P).
NO
Connect the high pressure sensor and turn on again.
YES
The relationship between the VH and high pressure is normal (see ∗2) when voltage is measured between X22A pins (1) and (3) of outdoor unit PC board (A1P) (see ∗1).
YES
Replace outdoor unit PC board A1P.
NO
Replace the high pressure sensor.

(VF049)

∗1: Voltage measurement point



(VL077)

∗2: Refer to pressure sensor, pressure / voltage characteristics table on P587.

3.24 Outdoor Unit: Malfunction of Suction Pipe Pressure Sensor

Remote Controller Display

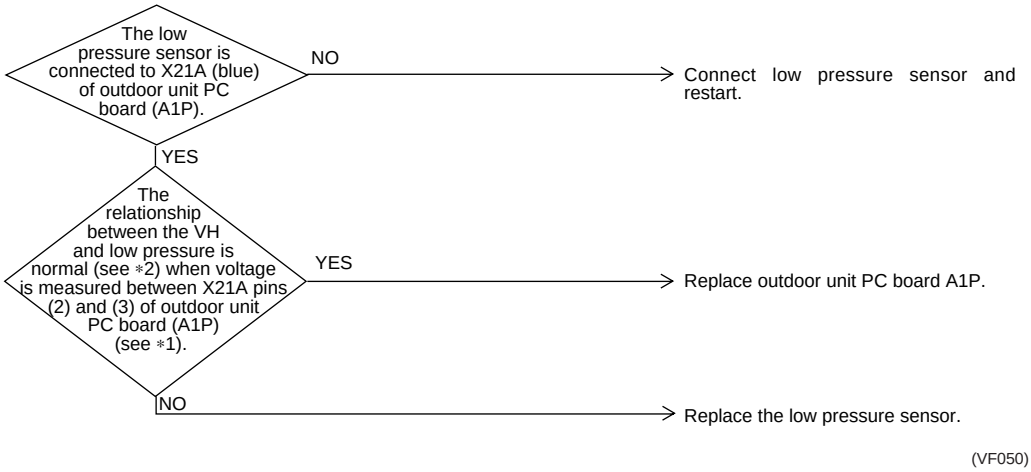
JC

Supposed Causes

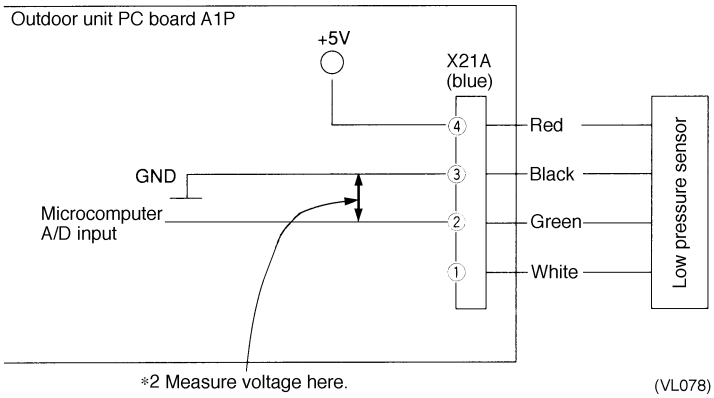
- Defect of low pressure sensor system
- Connection of high pressure sensor with wrong connection.
- Defect of outdoor unit PC board.

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The low pressure sensor is connected to X21A (blue) of outdoor unit PC board (A1P).
NO
Connect low pressure sensor and restart.
YES
The relationship between the VH and low pressure is normal (see ∗2) when voltage is measured between X21A pins (2) and (3) of outdoor unit PC board (A1P) (see ∗1).
YES
Replace outdoor unit PC board A1P.
NO
Replace the low pressure sensor.
(VF050)

∗1: Voltage measurement point



∗2: Refer to pressure sensor, pressure/voltage characteristics table on P587.

3.25 Outdoor Unit: Malfunction of Oil Temperature Thermistor (R5T)

Remote Controller Display

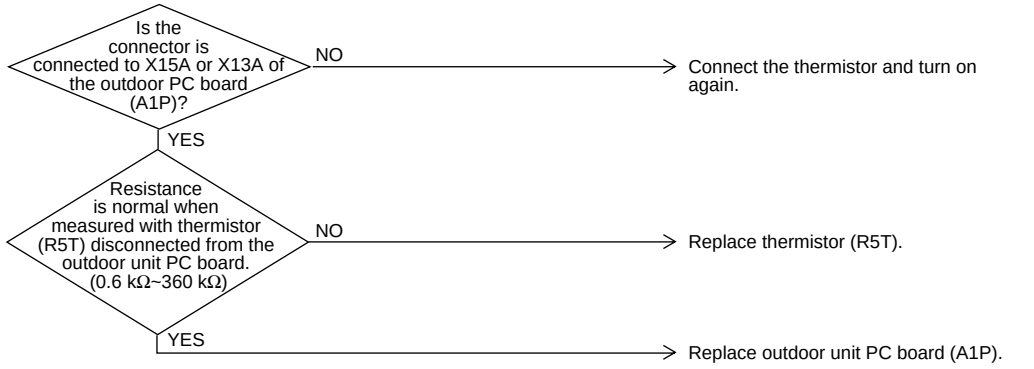
JH

Supposed Causes

- Defect of oil temperature thermistor (R5T)
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is the connector is connected to X15A or X13A of the outdoor PC board (A1P)?
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured with thermistor (R5T) disconnected from the outdoor unit PC board. (0.6 kΩ~360 kΩ)
NO
Replace thermistor (R5T).
YES
Replace outdoor unit PC board (A1P).

(VF051)

Note: MX1 Series
R5T ↔ X15A
ME1 Series
R5T ↔ X13A

3.26 Low Pressure Drop Due to Refrigerant Shortage or Electronic Expansion Valve Failure

Remote Controller Display

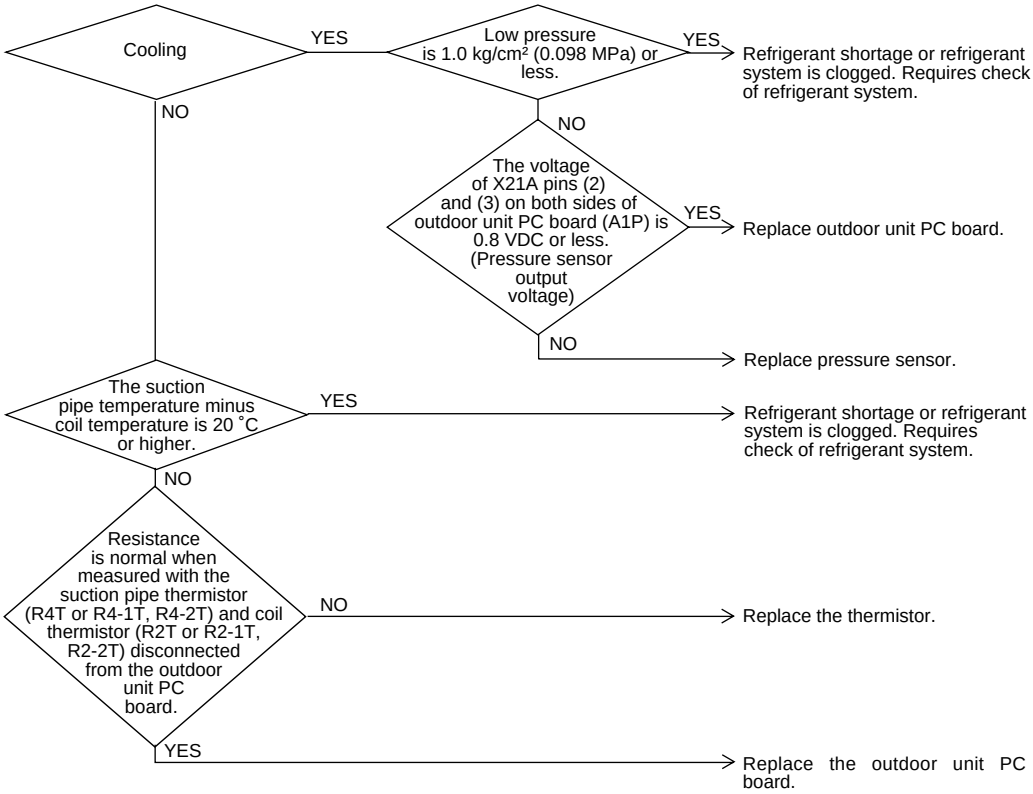
U0

Supposed Causes

- Refrigerant shortage or refrigerant system clogging (incorrect piping)
- Defect of pressure sensor
- Defect of outdoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Cooling
YES
Low pressure is 1.0 kg/cm² (0.098 MPa) or less.
YES
Refrigerant shortage or refrigerant system is clogged. Requires check of refrigerant system.
NO
NO
The voltage of X21A pins (2) and (3) on both sides of outdoor unit PC board (A1P) is 0.8 VDC or less. (Pressure sensor output voltage)
YES
Replace outdoor unit PC board.
NO
Replace pressure sensor.
The suction pipe temperature minus coil temperature is 20 ˚C or higher.
YES
Refrigerant shortage or refrigerant system is clogged. Requires check of refrigerant system.
NO
Resistance is normal when measured with the suction pipe thermistor (R4T or R4-1T, R4-2T) and coil thermistor (R2T or R2-1T, R2-2T) disconnected from the outdoor unit PC board.
NO
Replace the thermistor.
YES
Replace the outdoor unit PC board.

(VF052)

3.27 Negative Phase, Open Phase

Remote Controller Display

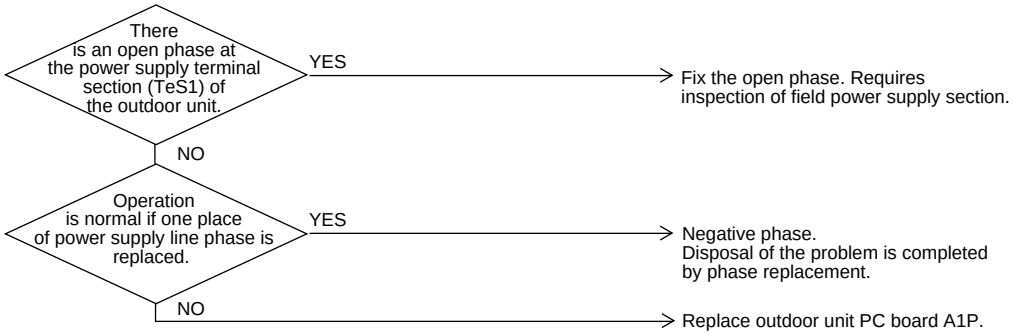
U1

Supposed Causes

- Power supply negative phase
- Power supply open phase
- Defect of outdoor PC board A1P

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


There is an open phase at the power supply terminal section (TeS1) of the outdoor unit.
YES
Fix the open phase. Requires inspection of field power supply section.
NO
Operation is normal if one place of power supply line phase is replaced.
YES
Negative phase. Disposal of the problem is completed by phase replacement.
NO
Replace outdoor unit PC board A1P.

(VF053)

3.28 Malfunction of Transmission between Indoor Units

Remote Controller Display

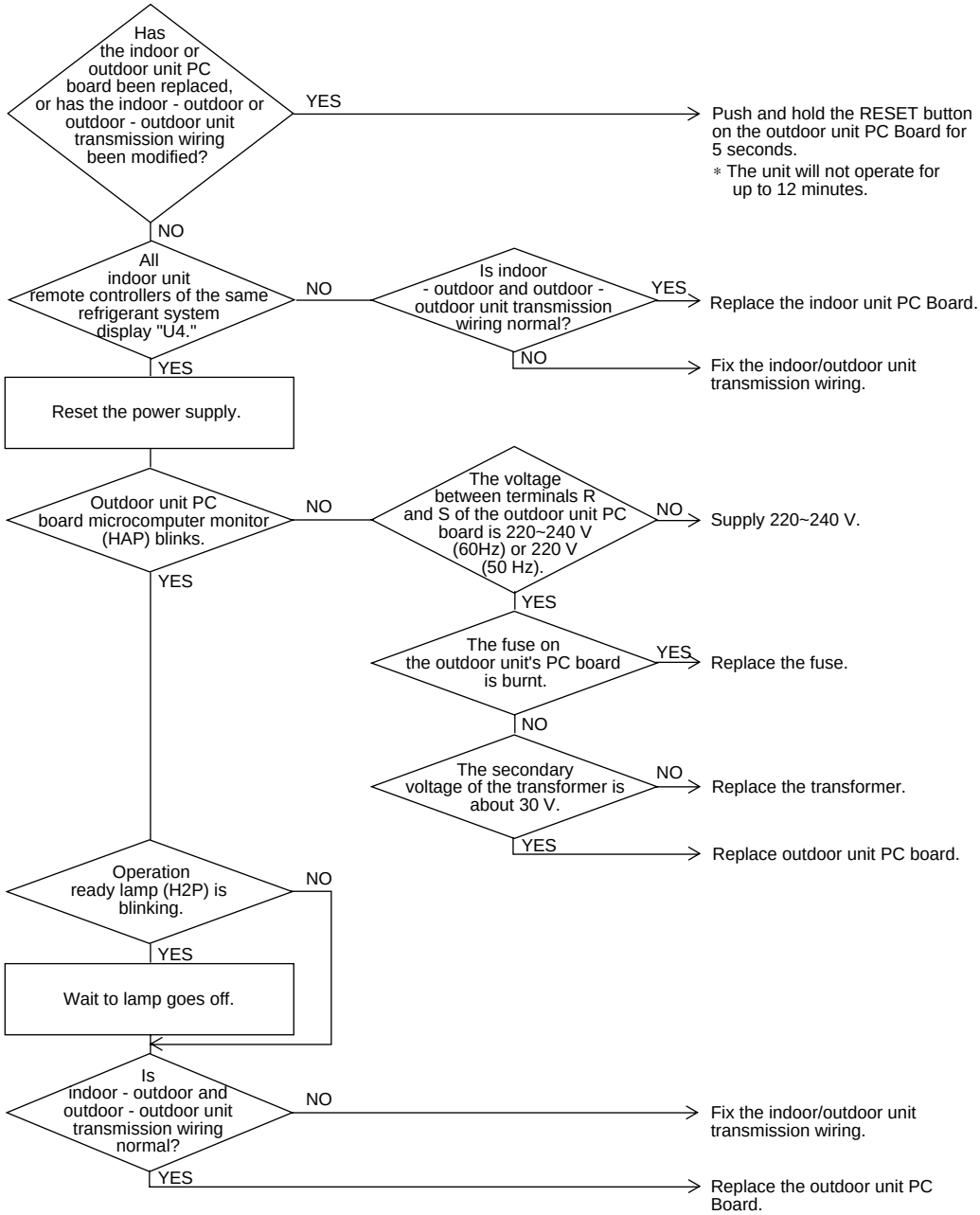
U4

Supposed Causes

- Indoor to outdoor, outdoor to outdoor crossover wiring, disconnection or short circuit
- Outdoor unit power supply is OFF
- System address doesn't match
- Defect of indoor unit PC board
- Defect of outdoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Has the indoor or outdoor unit PC board been replaced, or has the indoor - outdoor or outdoor - outdoor unit transmission wiring been modified?
YES
Push and hold the RESET button on the outdoor unit PC Board for 5 seconds.
* The unit will not operate for up to 12 minutes.
NO
All indoor unit remote controllers of the same refrigerant system display "U4."
NO
Is indoor - outdoor and outdoor - outdoor unit transmission wiring normal?
YES
Replace the indoor unit PC Board.
NO
Fix the indoor/outdoor unit transmission wiring.
YES
Reset the power supply.
Outdoor unit PC board microcomputer monitor (HAP) blinks.
NO
The voltage between terminals R and S of the outdoor unit PC board is 220~240 V (60Hz) or 220 V (50 Hz).
NO
Supply 220~240 V.
YES
YES
The fuse on the outdoor unit's PC board is burnt.
YES
Replace the fuse.
NO
The secondary voltage of the transformer is about 30 V.
NO
Replace the transformer.
YES
Replace outdoor unit PC board.
Operation ready lamp (H2P) is blinking.
NO
YES
Wait to lamp goes off.
Is indoor - outdoor and outdoor - outdoor unit transmission wiring normal?
NO
Fix the indoor/outdoor unit transmission wiring.
YES
Replace the outdoor unit PC Board.

(VF054)

3.29 Malfunction of Transmission between Remote Controller and Indoor Unit

Remote Controller Display

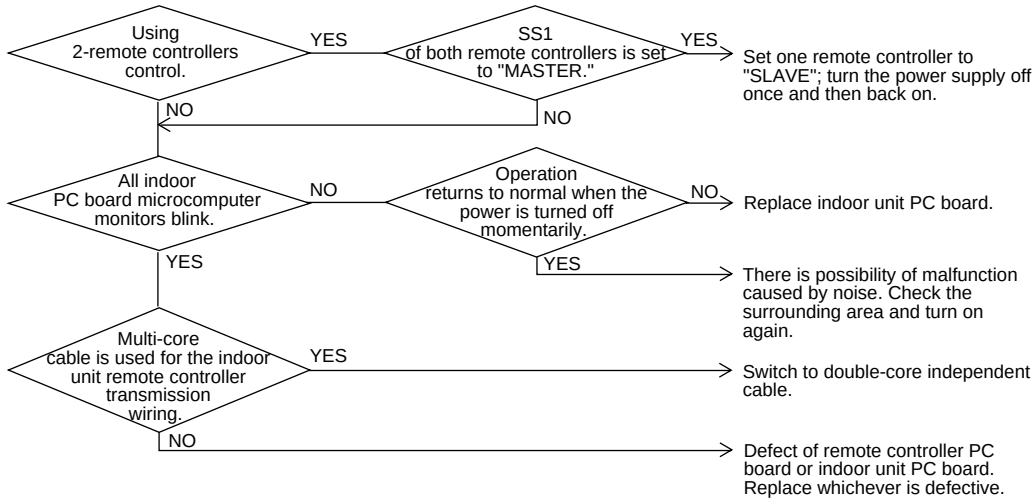
U5

Supposed Causes

- Malfunction of indoor unit remote controller transmission
- Connection of two main remote controllers (when using 2 remote controllers)
- Defect of indoor unit PC board
- Defect of remote controller PC board
- Malfunction of transmission caused by noise

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Using 2-remote controllers control.
YES
SS1 of both remote controllers is set to "MASTER."
YES
Set one remote controller to "SLAVE"; turn the power supply off once and then back on.
NO
NO
All indoor PC board microcomputer monitors blink.
NO
Operation returns to normal when the power is turned off momentarily.
NO
Replace indoor unit PC board.
YES
YES
There is possibility of malfunction caused by noise. Check the surrounding area and turn on again.
Multi-core cable is used for the indoor unit remote controller transmission wiring.
YES
Switch to double-core independent cable.
NO
Defect of remote controller PC board or indoor unit PC board. Replace whichever is defective.

(VF055)

3.30 Malfunction of Transmission between Outdoor Units

Remote Controller Display

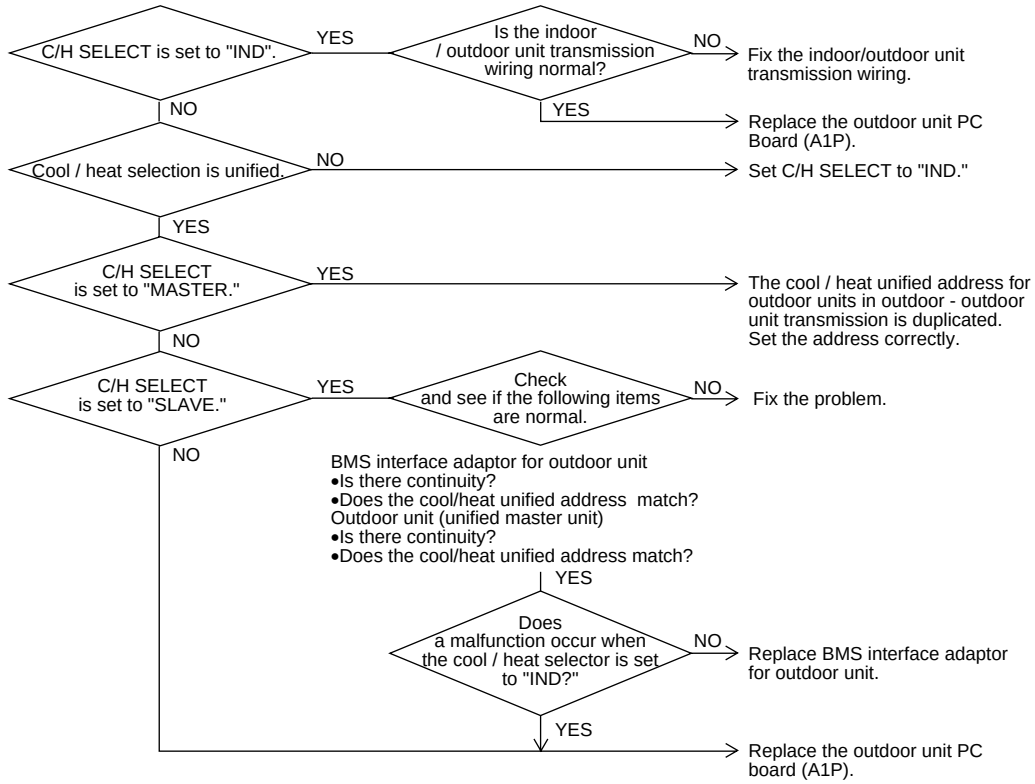
U7

Supposed Causes

- Improper connection of transmission wiring between outdoor unit and BMS interface adaptor for outdoor unit
- Improper cool/heat selection
- Improper cool/heat unified address (outdoor unit, BMS interface adaptor for outdoor unit)
- Defect of outdoor unit PC board (A1P)
- Defect of BMS interface adaptor for outdoor unit (option)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


C/H SELECT is set to "IND".
YES
Is the indoor / outdoor unit transmission wiring normal?
NO
Fix the indoor/outdoor unit transmission wiring.
YES
Replace the outdoor unit PC Board (A1P).
NO
Cool / heat selection is unified.
NO
Set C/H SELECT to "IND."
YES
C/H SELECT is set to "MASTER."
YES
The cool / heat unified address for outdoor units in outdoor - outdoor unit transmission is duplicated. Set the address correctly.
NO
C/H SELECT is set to "SLAVE."
YES
Check and see if the following items are normal.
NO
Fix the problem.
NO
BMS interface adaptor for outdoor unit
•Is there continuity?
•Does the cool/heat unified address match?
Outdoor unit (unified master unit)
•Is there continuity?
•Does the cool/heat unified address match?
YES
Does a malfunction occur when the cool / heat selector is set to "IND?"
NO
Replace BMS interface adaptor for outdoor unit.
YES
Replace the outdoor unit PC board (A1P).

(VF056)

3.31 Malfunction of Transmission between Master and Slave Remote Controllers

Remote Controller Display

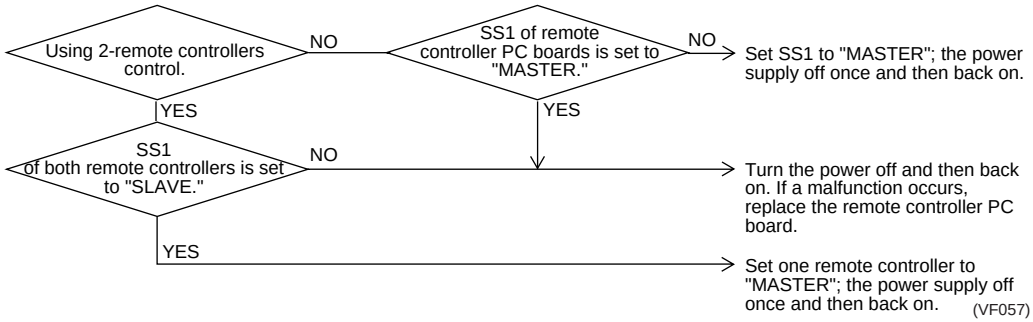
U8

Supposed Causes

- Malfunction of transmission between master and slave remote controller
- Connection between sub remote controllers
- Defect of remote controller PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Using 2-remote controllers control.
NO
SS1 of remote controller PC boards is set to "MASTER."
NO
Set SS1 to "MASTER"; the power supply off once and then back on.
YES
YES
SS1 of both remote controllers is set to "SLAVE."
NO
Turn the power off and then back on. If a malfunction occurs, replace the remote controller PC board.
YES
Set one remote controller to "MASTER"; the power supply off once and then back on.
(VF057)

3.32 Malfunction of Transmission between Indoor and Outdoor Units in the Same System

Remote Controller Display

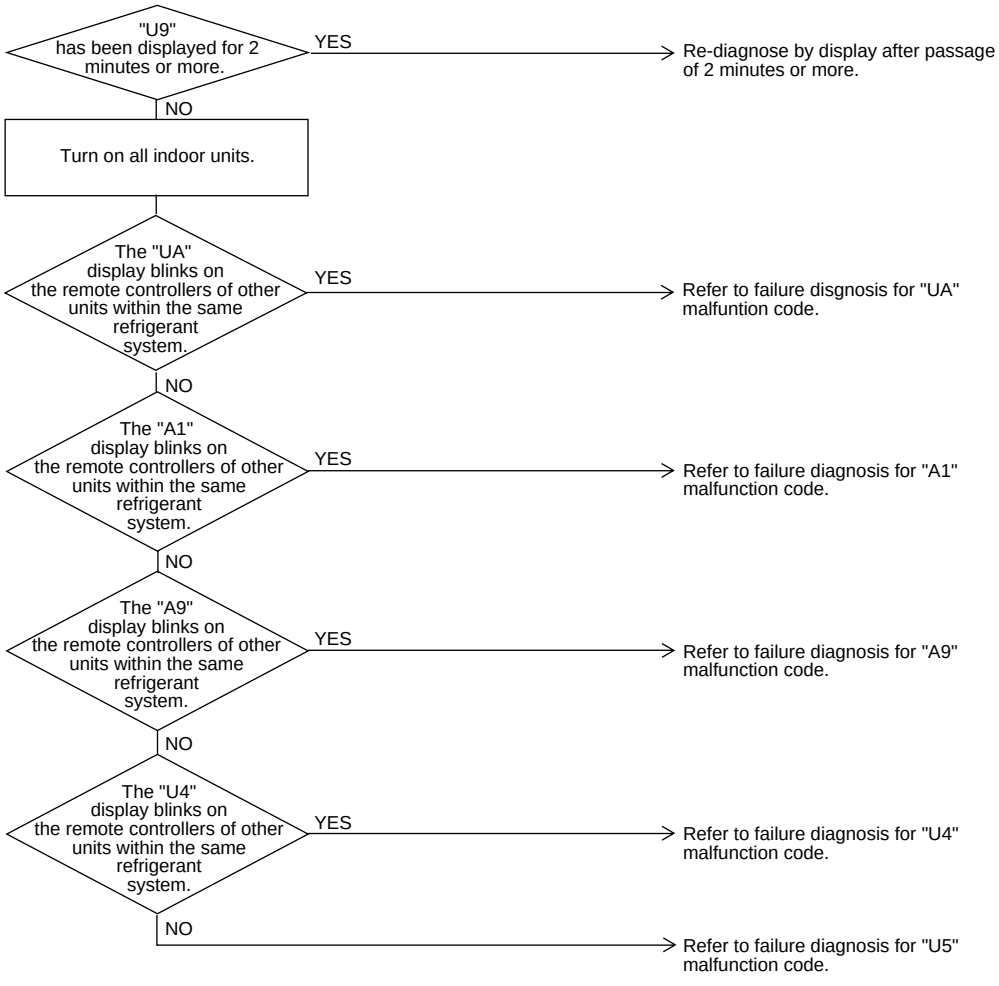
U9

Supposed Causes

- Malfunction of transmission between indoor and outdoor of other system
- Malfunction of electronic expansion valve in indoor unit of other system
- Defect of PC board of indoor unit in other system
- Improper connection of transmission wiring between indoor and outdoor unit

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


"U9" has been displayed for 2 minutes or more.
YES
Re-diagnose by display after passage of 2 minutes or more.
NO
Turn on all indoor units.
The "UA" display blinks on the remote controllers of other units within the same refrigerant system.
YES
Refer to failure disgnosis for "UA" malfuntion code.
NO
The "A1" display blinks on the remote controllers of other units within the same refrigerant system.
YES
Refer to failure diagnosis for "A1" malfunction code.
NO
The "A9" display blinks on the remote controllers of other units within the same refrigerant system.
YES
Refer to failure diagnosis for "A9" malfunction code.
NO
The "U4" display blinks on the remote controllers of other units within the same refrigerant system.
YES
Refer to failure diagnosis for "U4" malfunction code.
NO
Refer to failure diagnosis for "U5" malfunction code.

(VF058)

3.33 Excessive Number of Indoor Units

Remote Controller Display

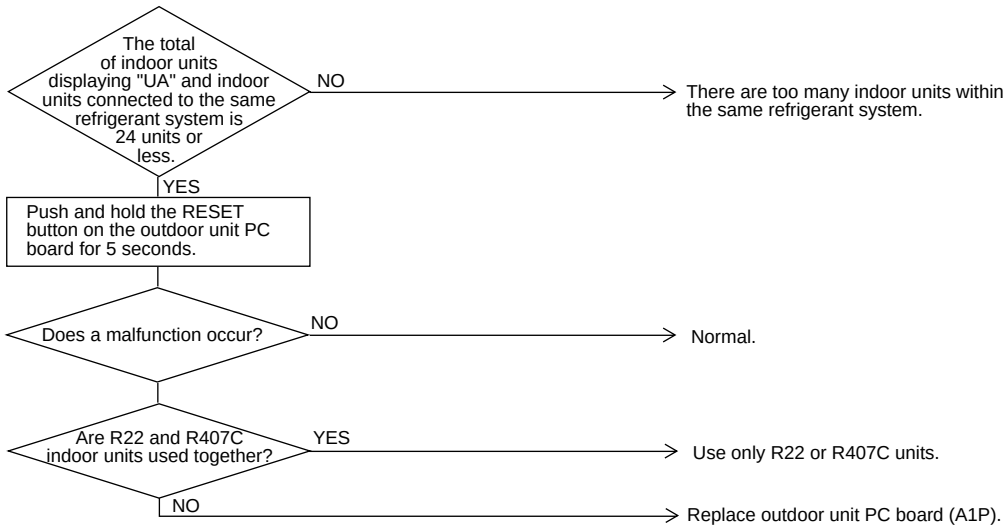
UA

Supposed Causes

- Excess of connected indoor units
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The total of indoor units displaying "UA" and indoor units connected to the same refrigerant system is 24 units or less.
NO
There are too many indoor units within the same refrigerant system.
YES
Push and hold the RESET button on the outdoor unit PC board for 5 seconds.
Does a malfunction occur?
NO
Normal.
Are R22 and R407C indoor units used together?
YES
Use only R22 or R407C units.
NO
Replace outdoor unit PC board (A1P).
(VF059)

The number of indoor units that can be connected to a single outdoor unit system depends on the type of outdoor unit.

CU-5MX : Max. 8 units
CU-8MX : Max. 13 units
CU-10MX : Max. 16 units
CU-8ME : Max. 13 units
CU-10ME : Max. 16 units

3.34 Address Duplication of Central Remote Controller

Remote Controller Display

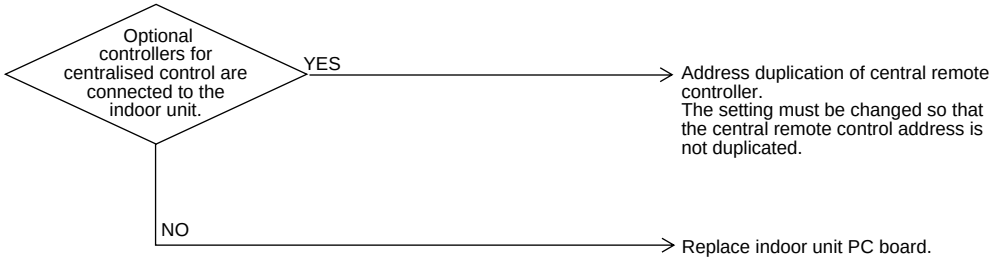
UC

Supposed Causes

- Address duplication of central remote controller
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Optional controllers for centralised control are connected to the indoor unit.
YES
Address duplication of central remote controller.
The setting must be changed so that the central remote control address is not duplicated.
NO
Replace indoor unit PC board.

(VF060)

3.35 Refrigerant System not set, Incompatible Wiring/Piping

Remote Controller Display

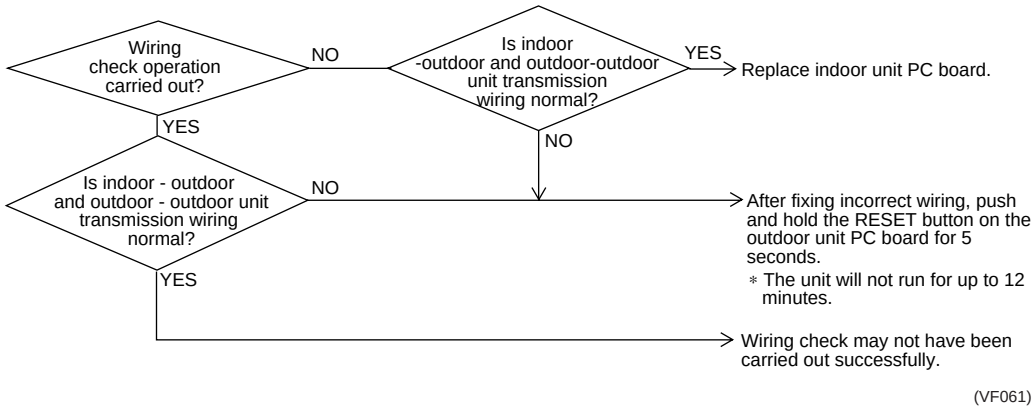
UF

Supposed Causes

- Improper connection of transmission wiring between indoor-outdoor unit and outdoor-outdoor unit
- Failure to execute wiring check operation
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Wiring check operation carried out?
NO
Is indoor -outdoor and outdoor-outdoor unit transmission wiring normal?
YES
Replace indoor unit PC board.
YES
NO
Is indoor - outdoor and outdoor - outdoor unit transmission wiring normal?
NO
After fixing incorrect wiring, push and hold the RESET button on the outdoor unit PC board for 5 seconds.
∗ The unit will not run for up to 12 minutes.
YES
Wiring check may not have been carried out successfully.
(VF061)

Wiring check may not be successful if carried out after the outdoor unit has been off for more than 12 hours, or if it is not carried out after running all connected indoor units in the fan mode for at least an hour.

3.36 Malfunction of System, Refrigerant System Address Undefined

Remote Controller Display

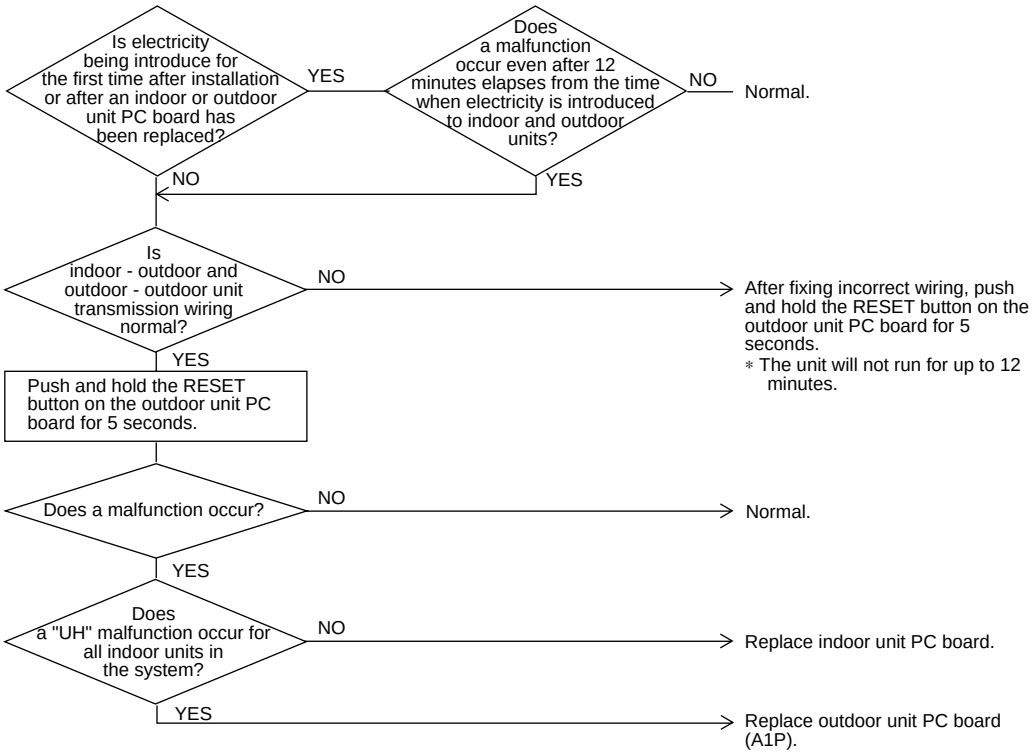
UH

Supposed Causes

- Improper connection of transmission wiring between indoor-outdoor unit and outdoor-outdoor unit
- Defect of indoor unit PC board
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is electricity being introduce for the first time after installation or after an indoor or outdoor unit PC board has been replaced?
YES
Does a malfunction occur even after 12 minutes elapses from the time when electricity is introduced to indoor and outdoor units?
NO
Normal.
NO
YES
Is indoor - outdoor and outdoor - outdoor unit transmission wiring normal?
NO
After fixing incorrect wiring, push and hold the RESET button on the outdoor unit PC board for 5 seconds.
∗ The unit will not run for up to 12 minutes.
YES
Push and hold the RESET button on the outdoor unit PC board for 5 seconds.
Does a malfunction occur?
NO
Normal.
YES
Does a "UH" malfunction occur for all indoor units in the system?
NO
Replace indoor unit PC board.
YES
Replace outdoor unit PC board (A1P).

(VF062)

4. Failure Diagnosis for Inverter System

4.1 Points of Diagnosis

The main causes for each malfunction code are given in the table below. (For details refer to the next page and those following.)

◎ : Failure is probable
○ : Failure is possible
□ : Failure is improbable
— : Failure is impossible

Malfunction code	Contents of malfunction	Location of failure							Point of diagnosis
		Inverter		Compressor	Refrigerant system	Outdoor unit PC board	Other	Field cause	
		PC board power unit	Other						
L4	Radiator fin temperature rise	□	◎	—	—	—	—	□	Is the intake port of the radiator fin clogged?
L5	Instantaneous over-current	○	—	◎	□	—	—	—	Inspect the compressor.
L8	Electronic thermostat	□	—	◎	○	—	—	—	Inspection the compressor and refrigerant system.
L9	Stall prevention	□	—	○	◎	—	—	—	Inspection the compressor and refrigerant system.
LC	Malfunction of transmission between inverter PC board and outdoor unit PC board	○	◎	—	—	□	—	—	Inspect the connection between the inverter PC board and outdoor unit PC board. Next, inspect the inverter PC board.
U2	Abnormal current/ voltage	○	○	—	—	—	□	◎	• Inspect the fuse on the inverter PC board. • Check the DC voltage.
P1	Over-ripple protection	○	○	—	—	—	—	○	• Open phase • Current/voltage imbalance • Defect of main circuit wiring
P4	Defect of radiator fin temperature sensor	○	□	—	—	—	—	—	Inspect the radiator fin thermistor.

4.2 How to use the Monitor Switch on the Inverter PC Board

The monitor lets you know the contents of the latest stop due to malfunction by LED display on the inverter PC Board. The inverter is equipped with a retry function that retries operation each time stop due to malfunction occurs, and malfunction is therefore not ascertained by merely entering the five minutes standby while retry is attempted the prescribed number of times. If the number of retry times is exceeded within 60 minutes, malfunction is ascertained, and the corresponding malfunction code is displayed on the indoor unit remote controller.

LED	A	1	2	3	4	Malfunction contents	Retry times
	◑	●	●	●	●	Normal	
	◑	●	●	●	○	Malfunction of fin thermistor	3
	◑	○	○	●	●	Sensor malfunction	0
	◑	○	●	●	○	Insufficient voltage	3
	◑	●	●	○	●	Instantaneous over-current	3
	◑	●	○	○	○	Electronic thermistor	3
	◑	○	○	○	○	Stall prevention	3
	◑	●	○	●	●	Open phase detection	3
	●	●	●	●	●	Malfunction of microcomputer	Unlimited

◑ : Blink
○ : On
● : Off

5. Troubleshooting (Inverter)

5.1 Outdoor Unit: Malfunction of Inverter Radiating Fin Temperature Rise

Remote Controller Display

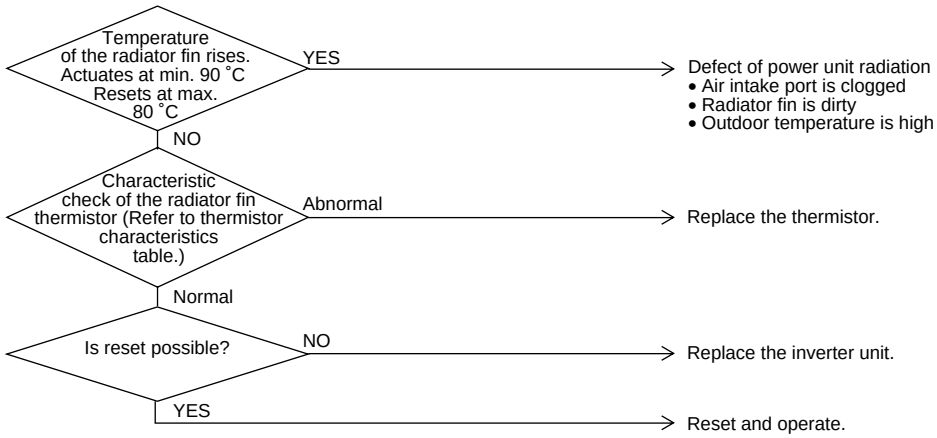
L4

Supposed Causes

- Actuation of fin thermal (Actuates at min. 90°C and resets at max. 80°C)
- Defect of inverter PC board
- Defect of fin thermistor

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Temperature of the radiator fin rises. Actuates at min. 90 ˚C Resets at max. 80 ˚C
YES
Defect of power unit radiation
• Air intake port is clogged
• Radiator fin is dirty
• Outdoor temperature is high
NO
Characteristic check of the radiator fin thermistor (Refer to thermistor characteristics table.)
Abnormal
Replace the thermistor.
Normal
Is reset possible?
NO
Replace the inverter unit.
YES
Reset and operate.

(VF063)

5.2 Outdoor Unit: Inverter Instantaneous Over-Current

Remote Controller Display

L5

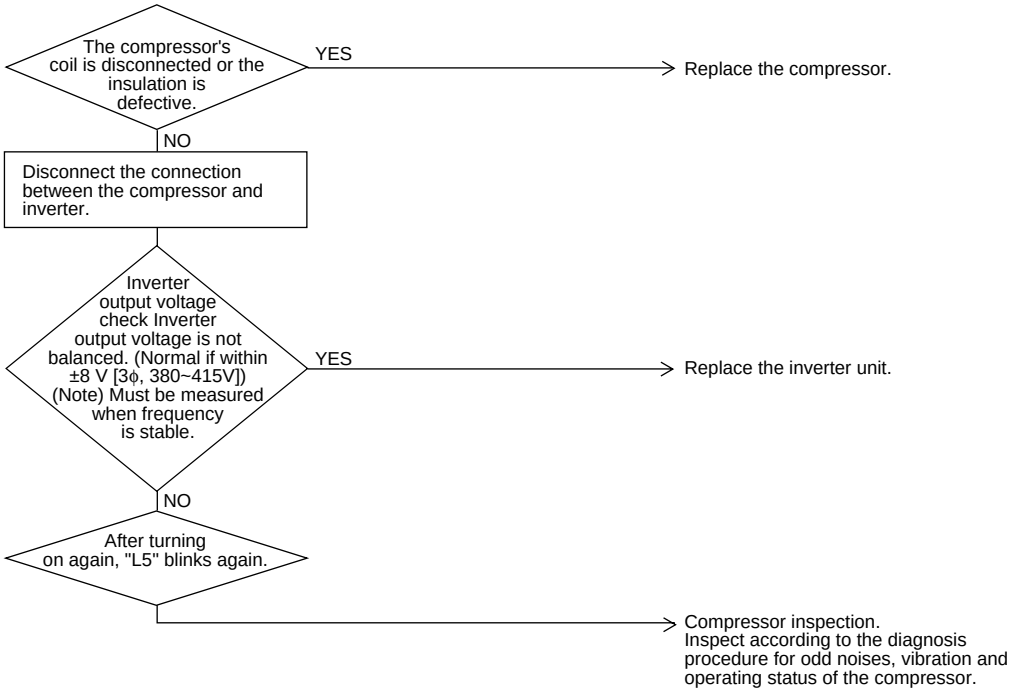
Supposed Causes

- Defect of compressor coil (disconnected, defective insulation)
- Compressor start-up malfunction (mechanical lock)
- Defect of inverter unit

Troubleshooting

Compressor inspection

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The compressor's coil is disconnected or the insulation is defective.
YES
Replace the compressor.
NO
Disconnect the connection between the compressor and inverter.
Inverter output voltage check Inverter output voltage is not balanced. (Normal if within ±8 V [3ϕ, 380~415V]) (Note) Must be measured when frequency is stable.
YES
Replace the inverter unit.
NO
After turning on again, "L5" blinks again.
Compressor inspection. Inspect according to the diagnosis procedure for odd noises, vibration and operating status of the compressor.
(VF064)

∗ If inverter output voltage is measured by tester, the displayed voltage is higher than artual voltage.

5.3 Outdoor Unit: Inverter Thermostat Sensor, Compressor Overload

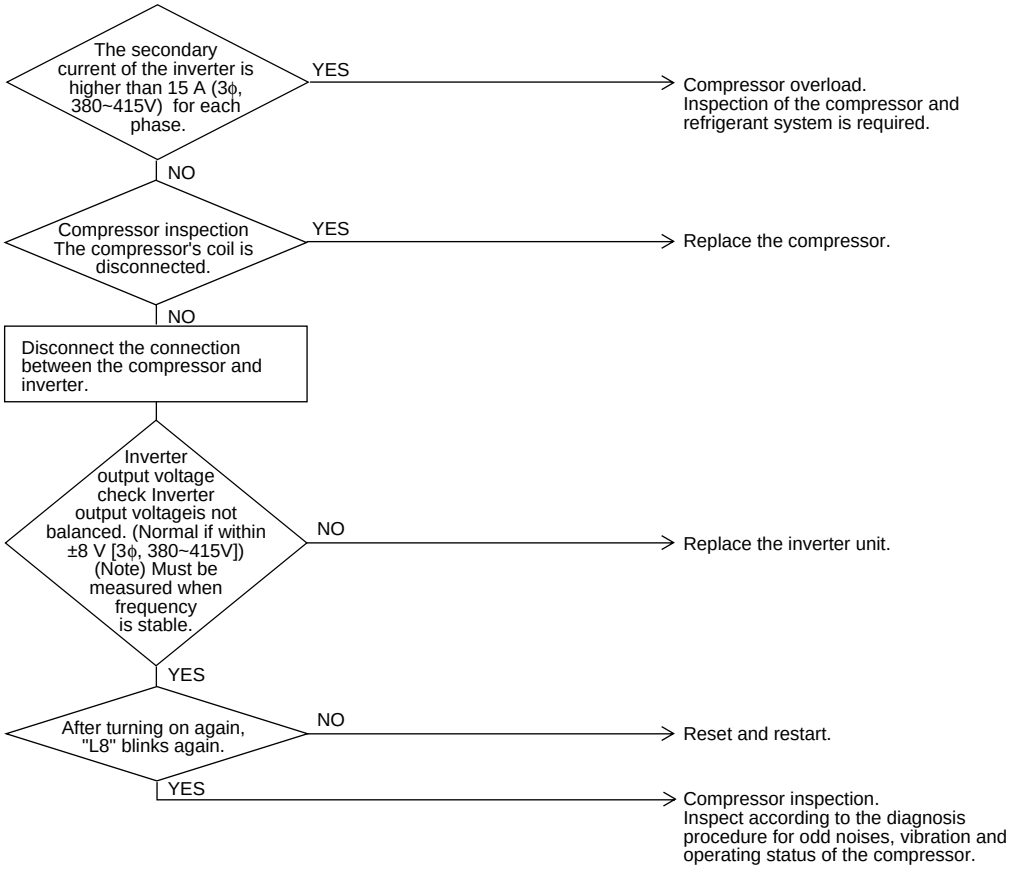
Remote Controller Display L8

Supposed Causes

- Compressor overload
- Compressor coil disconnected
- Defect of inverter unit

Troubleshooting Output current check

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The secondary current of the inverter is higher than 15 A (3ϕ, 380~415V) for each phase.
YES
Compressor overload. Inspection of the compressor and refrigerant system is required.
NO
Compressor inspection The compressor's coil is disconnected.
YES
Replace the compressor.
NO
Disconnect the connection between the compressor and inverter.
Inverter output voltage check Inverter output voltageis not balanced. (Normal if within ±8 V [3ϕ, 380~415V]) (Note) Must be measured when frequency is stable.
NO
Replace the inverter unit.
YES
After turning on again, "L8" blinks again.
NO
Reset and restart.
YES
Compressor inspection. Inspect according to the diagnosis procedure for odd noises, vibration and operating status of the compressor.

(VF065)

5.4 Outdoor Unit: Inverter Stall Prevention, Compressor Lock

Remote Controller Display

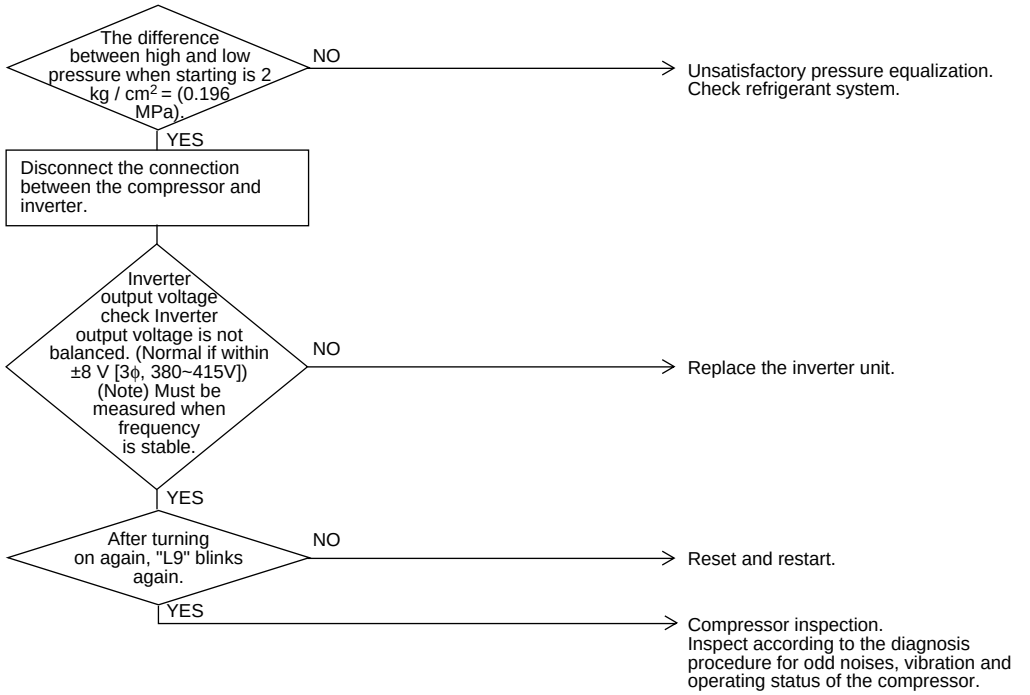
L9

Supposed Causes

- Defect of compressor
- Pressure differential start
- Defect of inverter unit

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The difference between high and low pressure when starting is 2 kg / cm2 = (0.196 MPa).
NO
Unsatisfactory pressure equalization. Check refrigerant system.
YES
Disconnect the connection between the compressor and inverter.
Inverter output voltage check Inverter output voltage is not balanced. (Normal if within ±8 V [3ϕ, 380~415V]) (Note) Must be measured when frequency is stable.
NO
Replace the inverter unit.
YES
After turning on again, "L9" blinks again.
NO
Reset and restart.
YES
Compressor inspection. Inspect according to the diagnosis procedure for odd noises, vibration and operating status of the compressor.

(VF066)

5.5 Outdoor Unit: Malfunction of Transmission between Inverter and Control PC Board

Remote Controller Display

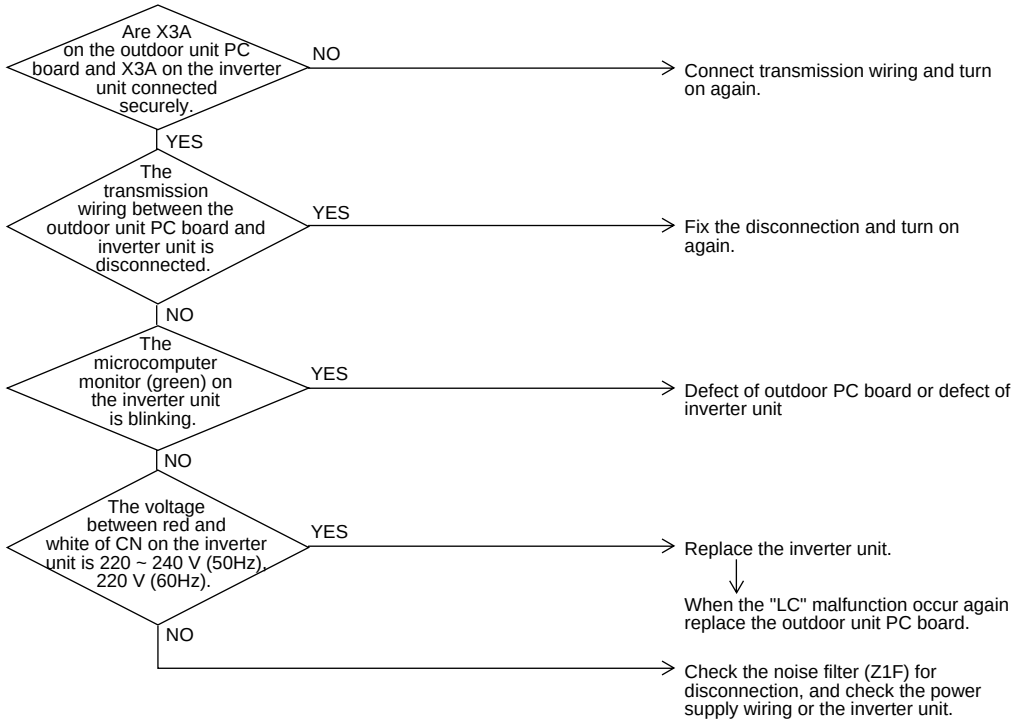
LC

Supposed Causes

- Malfunction of connection between the inverter unit and outdoor unit PC board
- Defect of outdoor unit PC board (transmission section)
- Defect of inverter unit
- Defect of noise filter (Z1F)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Are X3A on the outdoor unit PC board and X3A on the inverter unit connected securely.
NO
Connect transmission wiring and turn on again.
YES
The transmission wiring between the outdoor unit PC board and inverter unit is disconnected.
YES
Fix the disconnection and turn on again.
NO
The microcomputer monitor (green) on the inverter unit is blinking.
YES
Defect of outdoor PC board or defect of inverter unit
NO
The voltage between red and white of CN on the inverter unit is 220 ~ 240 V (50Hz), 220 V (60Hz).
YES
Replace the inverter unit.
When the "LC" malfunction occur again replace the outdoor unit PC board.
NO
Check the noise filter (Z1F) for disconnection, and check the power supply wiring or the inverter unit.

(VF067)

5.6 Power Supply Insufficient or Instantaneous Failure

Remote Controller Display

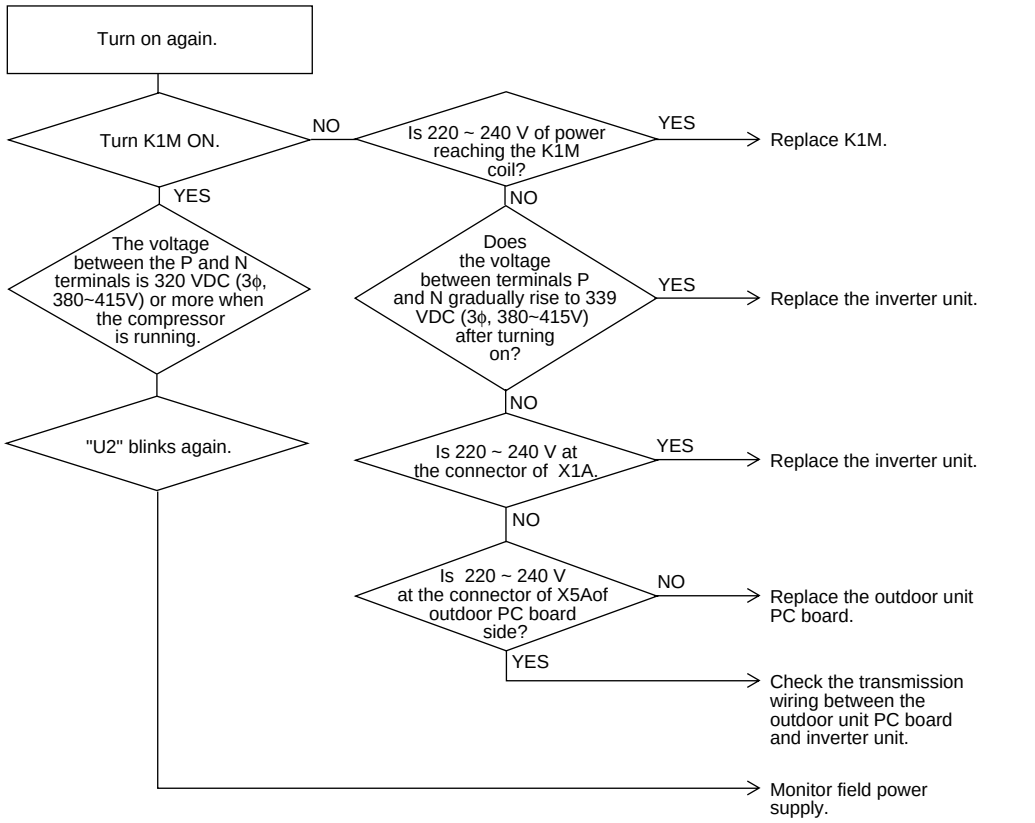
U2

Supposed Causes

- Power supply insufficient
- Instantaneous failure
- Open phase
- Defect of inverter unit
- Defect of outdoor PC board
- Defect of K1M.
- Main circuit wiring defect

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Turn on again.
Turn K1M ON.
NO
Is 220 ~ 240 V of power reaching the K1M coil?
YES
Replace K1M.
YES
NO
The voltage between the P and N terminals is 320 VDC (3ϕ, 380~415V) or more when the compressor is running.
Does the voltage between terminals P and N gradually rise to 339 VDC (3ϕ, 380~415V) after turning on?
YES
Replace the inverter unit.
NO
"U2" blinks again.
Is 220 ~ 240 V at the connector of X1A.
YES
Replace the inverter unit.
NO
Is 220 ~ 240 V at the connector of X5Aof outdoor PC board side?
NO
Replace the outdoor unit PC board.
YES
Check the transmission wiring between the outdoor unit PC board and inverter unit.
Monitor field power supply.

(VF068)

5.7 Outdoor Unit: Inverter Over-Ripple Protection

Remote Controller Display

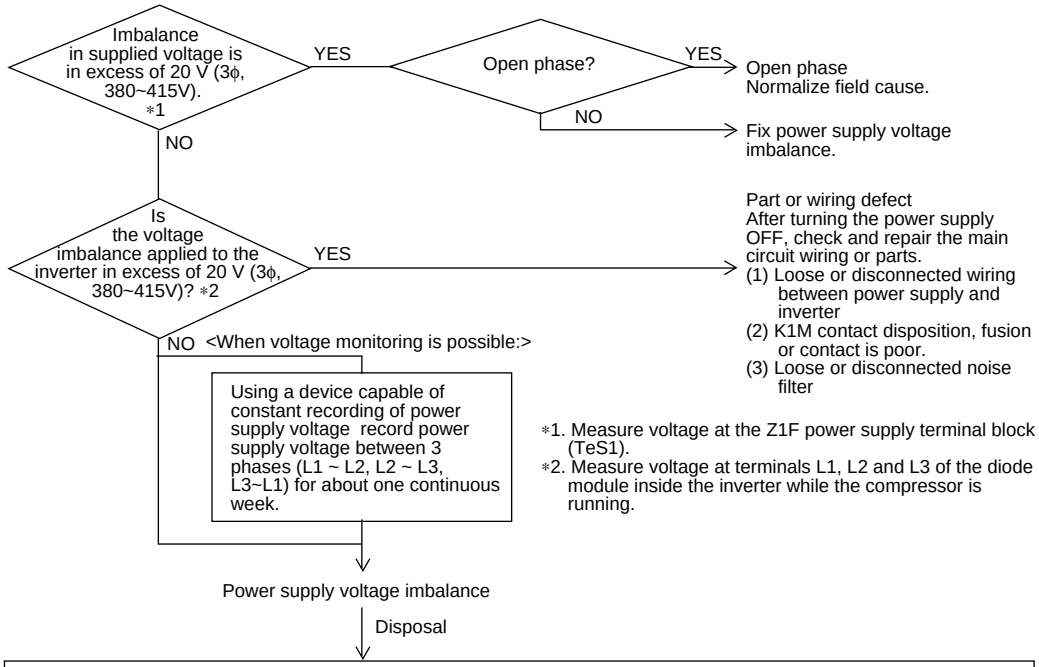
P1

Supposed Causes

- Open phase
- Voltage imbalance between phases
- Defect of main circuit capacitor
- Defect of inverter unit
- Defect of K1M
- Improper main circuit wiring

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Imbalance in supplied voltage is in excess of 20 V (3ϕ, 380~415V). ∗1
YES
Open phase?
YES
Open phase
Normalize field cause.
NO
Fix power supply voltage imbalance.
NO
Is the voltage imbalance applied to the inverter in excess of 20 V (3ϕ, 380~415V)? ∗2
YES
Part or wiring defect
After turning the power supply OFF, check and repair the main circuit wiring or parts.
(1) Loose or disconnected wiring between power supply and inverter
(2) K1M contact disposition, fusion or contact is poor.
(3) Loose or disconnected noise filter
NO
<When voltage monitoring is possible:>
Using a device capable of constant recording of power supply voltage record power supply voltage between 3 phases (L1 ~ L2, L2 ~ L3, L3~L1) for about one continuous week.
∗1. Measure voltage at the Z1F power supply terminal block (TeS1).
∗2. Measure voltage at terminals L1, L2 and L3 of the diode module inside the inverter while the compressor is running.
Power supply voltage imbalance
Disposal
Explanation for users
∗In accordance with "notification of inspection results" accompanying spare parts.
Give the user a copy of "notification of inspection results"and leave it up to him to improve the imbalance.
Be sure to explain to the user that there is a "power supply imbalance" for which MATSUSHITA is not responsible.
Contact QC div.
Be sure to send a product report of the imbalance.

(VF069)

5.8 Outdoor Unit: Malfunction of Inverter Radiating Fin Temperature Rise Sensor

Remote Controller Display

P4

Supposed Causes

- Defect of radiator fin temperature sensor
- Defect of inverter unit

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

Turn on again after letting 30 minutes or more pass after occurrence of malfunction.
"P4" occurs again.
Replace the radiator fin thermistor.

(VF070)

6. Troubleshooting (OP: Central Remote Controller)

6.1 Malfunction of Transmission between Central Remote Controller and Indoor Unit

Remote Controller Display

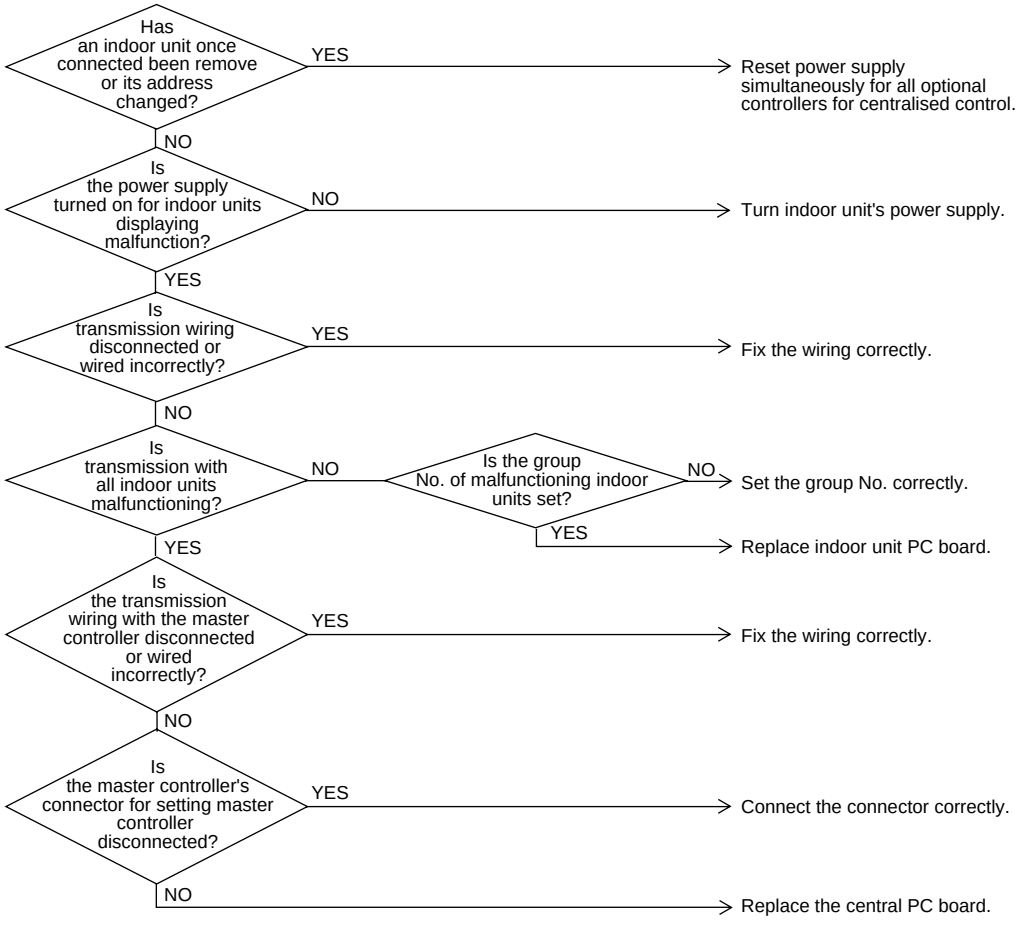
UE

Supposed Causes

- Malfunction of transmission between optional controllers for centralised control and indoor unit
- Connector for setting master controller is disconnected.
- Failure of PC board for central remote controller
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Has an indoor unit once connected been remove or its address changed?
YES
Reset power supply simultaneously for all optional controllers for centralised control.
NO
Is the power supply turned on for indoor units displaying malfunction?
NO
Turn indoor unit's power supply.
YES
Is transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is transmission with all indoor units malfunctioning?
NO
Is the group No. of malfunctioning indoor units set?
NO
Set the group No. correctly.
YES
Replace indoor unit PC board.
YES
Is the transmission wiring with the master controller disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is the master controller's connector for setting master controller disconnected?
YES
Connect the connector correctly.
NO
Replace the central PC board.

(VF071)

6.2 PC Board Defect

Remote Controller Display	
Supposed Causes	■ Defect of central remote controller PC board
Troubleshooting	Replace the central remote controller PC board.

6.3 Malfunction of Transmission between Optional Controllers for Centralised Control

Remote Controller Display

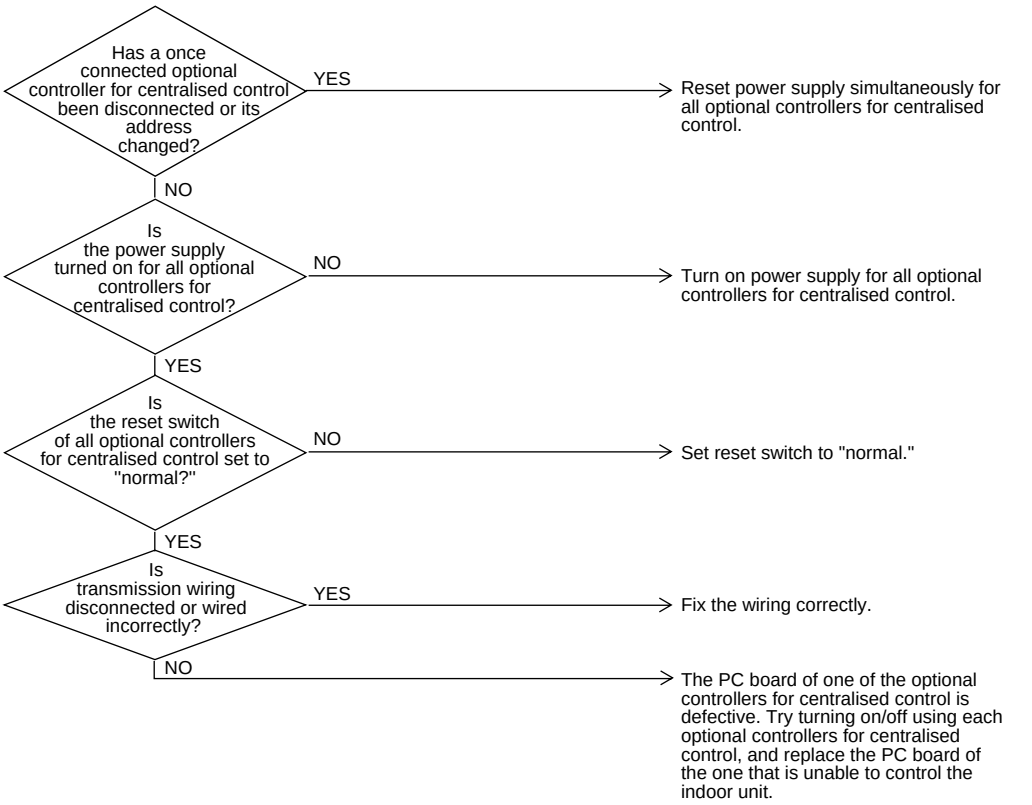
M8

Supposed Causes

- Malfunction of transmission between optional controllers for centralised control
- Defect of PC board of optional controllers for centralised control

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Has a once connected optional controller for centralised control been disconnected or its address changed?
YES
Reset power supply simultaneously for all optional controllers for centralised control.
NO
Is the power supply turned on for all optional controllers for centralised control?
NO
Turn on power supply for all optional controllers for centralised control.
YES
Is the reset switch of all optional controllers for centralised control set to "normal?"
NO
Set reset switch to "normal."
YES
Is transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
The PC board of one of the optional controllers for centralised control is defective. Try turning on/off using each optional controllers for centralised control, and replace the PC board of the one that is unable to control the indoor unit.

(VF072)

6.4 Improper Combination of Optional Controllers for Centralised Control

Remote Controller Display

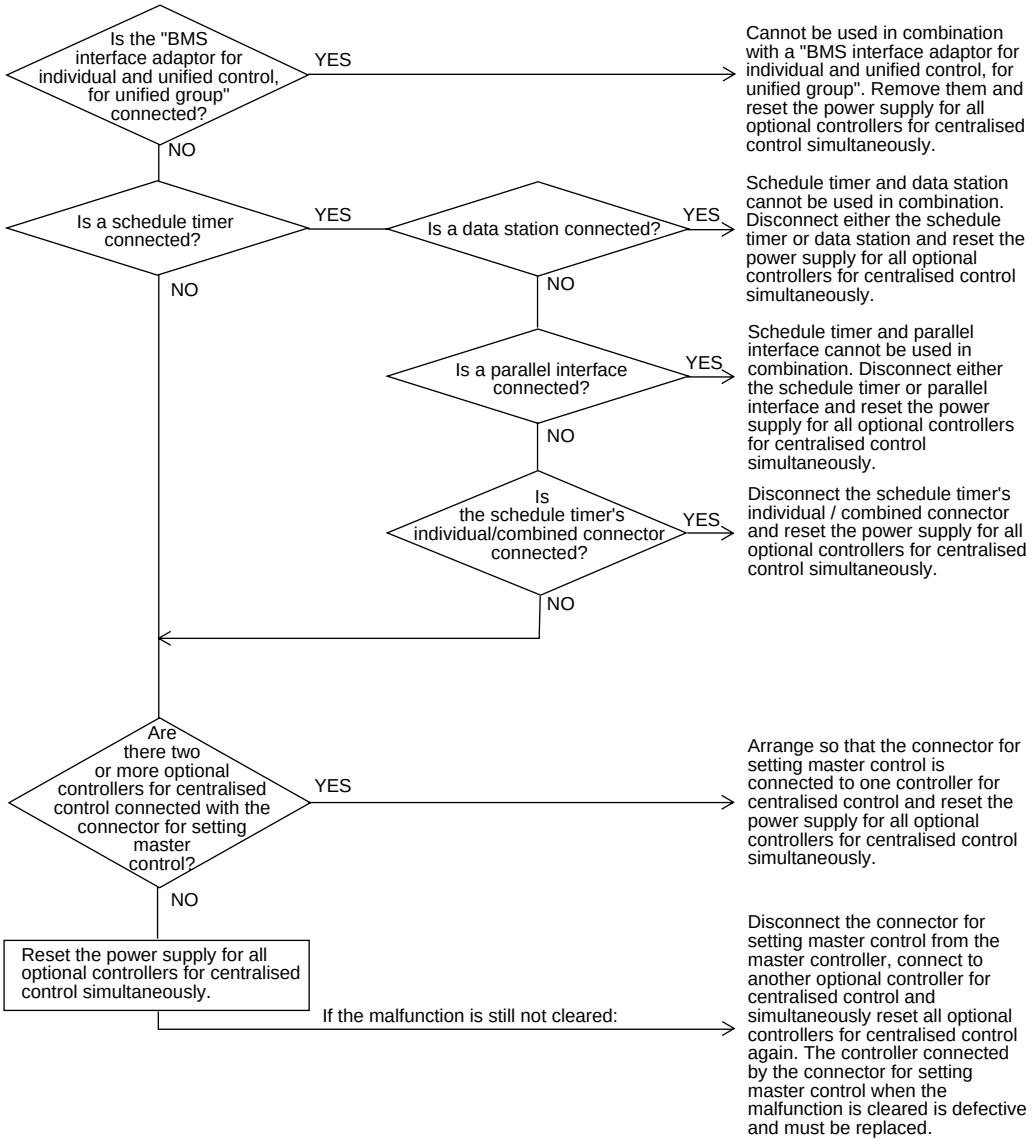
MA

Supposed Causes

- Improper combination of optional controllers for centralised control
- More than one master controller is connected
- Defect of PC board of optional controller for centralised control

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is the "BMS interface adaptor for individual and unified control, for unified group" connected?
YES
Cannot be used in combination with a "BMS interface adaptor for individual and unified control, for unified group". Remove them and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Is a schedule timer connected?
YES
Is a data station connected?
YES
Schedule timer and data station cannot be used in combination. Disconnect either the schedule timer or data station and reset the power supply for all optional controllers for centralised control simultaneously.
NO
NO
Is a parallel interface connected?
YES
Schedule timer and parallel interface cannot be used in combination. Disconnect either the schedule timer or parallel interface and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Is the schedule timer's individual/combined connector connected?
YES
Disconnect the schedule timer's individual / combined connector and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Are there two or more optional controllers for centralised control connected with the connector for setting master control?
YES
Arrange so that the connector for setting master control is connected to one controller for centralised control and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Reset the power supply for all optional controllers for centralised control simultaneously.
If the malfunction is still not cleared:
Disconnect the connector for setting master control from the master controller, connect to another optional controller for centralised control and simultaneously reset all optional controllers for centralised control again. The controller connected by the connector for setting master control when the malfunction is cleared is defective and must be replaced.

(VF073)

6.5 Address Duplication, Improper Setting

Remote Controller Display

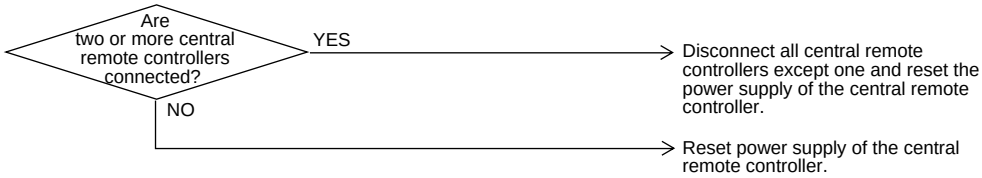
MC

Supposed Causes

- Address duplication of central remote controller

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Are two or more central remote controllers connected?
YES
Disconnect all central remote controllers except one and reset the power supply of the central remote controller.
NO
Reset power supply of the central remote controller.

(VF074)

7. Troubleshooting (OP: Schedule Timer)

7.1 Malfunction of Transmission between Central Remote Controller and Indoor Unit

Remote Controller Display

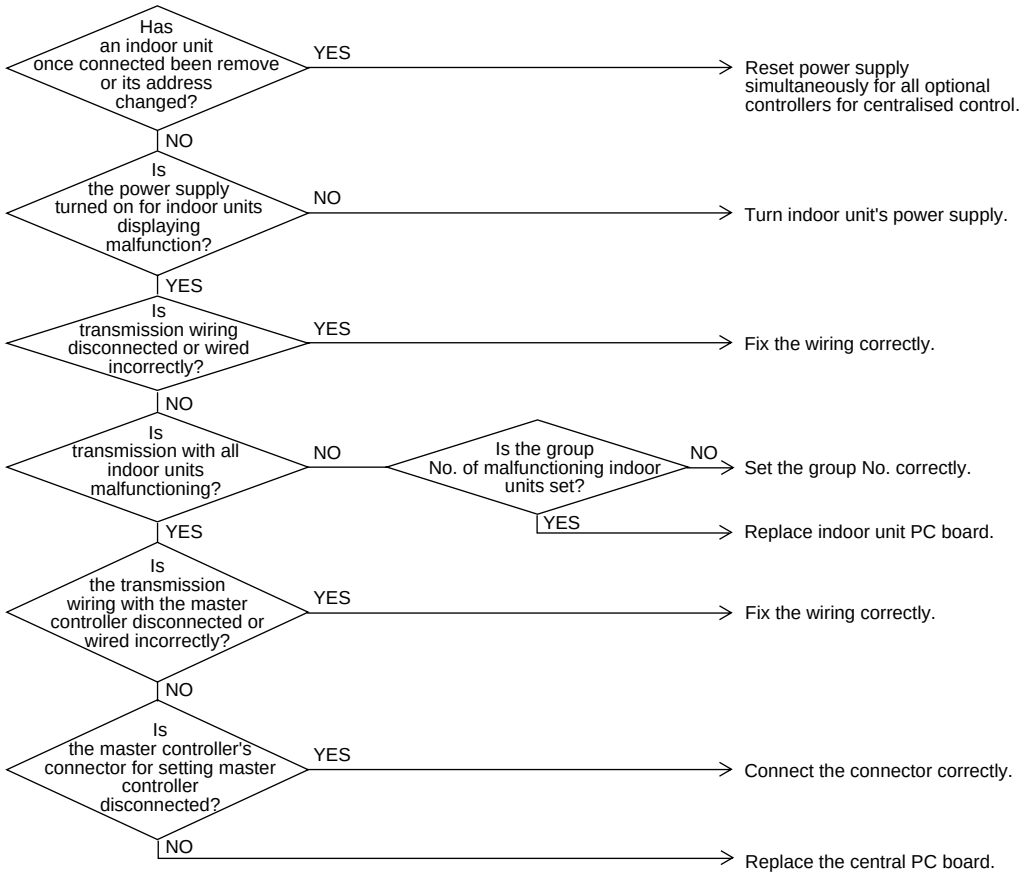
UE

Supposed Causes

- Malfunction of transmission between central remote controller and indoor unit
- Disconnection of connector for setting master controller (or individual/combined switching connector)
- Defect of schedule timer PC board
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Has an indoor unit once connected been remove or its address changed?
YES
Reset power supply simultaneously for all optional controllers for centralised control.
NO
Is the power supply turned on for indoor units displaying malfunction?
NO
Turn indoor unit's power supply.
YES
Is transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is transmission with all indoor units malfunctioning?
NO
Is the group No. of malfunctioning indoor units set?
NO
Set the group No. correctly.
YES
Replace indoor unit PC board.
YES
Is the transmission wiring with the master controller disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is the master controller's connector for setting master controller disconnected?
YES
Connect the connector correctly.
NO
Replace the central PC board.

(VF075)

7.2 PC Board Defect

Remote Controller Display	
Supposed Causes	■ Defect of schedule timer PC board
Troubleshooting	Replace the schedule timer PC board.

7.3 Malfunction of Transmission between Optional Controllers for Centralised Control

Remote Controller Display

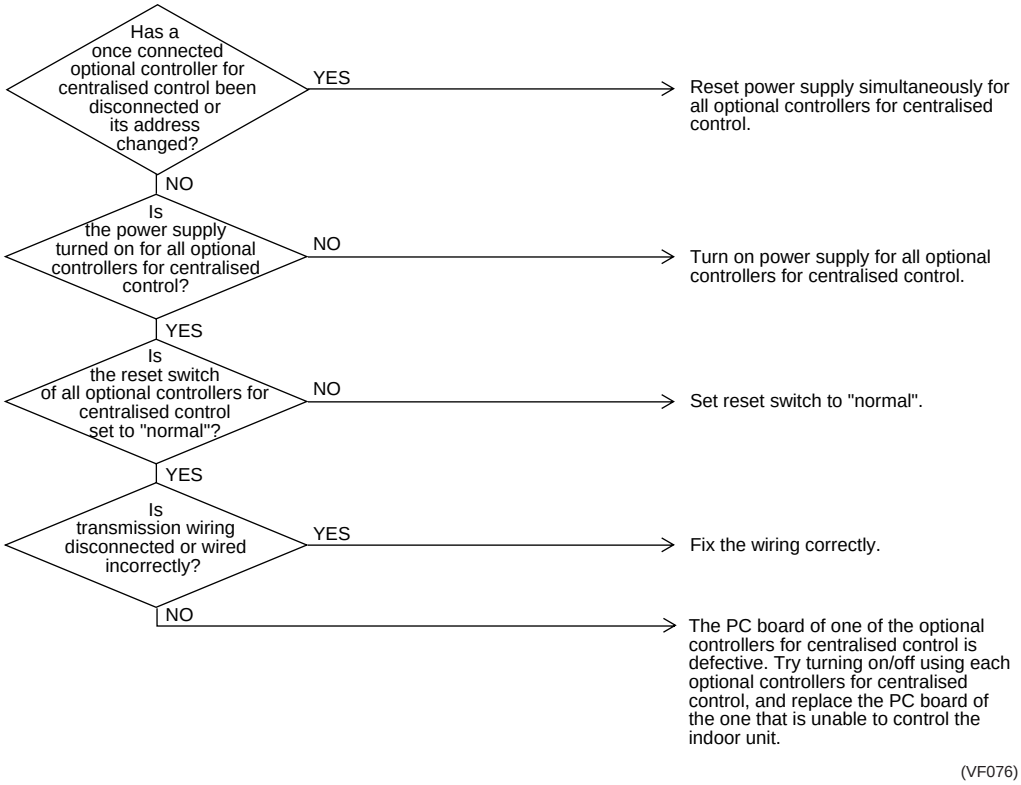
M8

Supposed Causes

- Malfunction of transmission between optional controllers for centralised control
- Defect of PC board of optional controllers for centralised control

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Has a once connected optional controller for centralised control been disconnected or its address changed?
YES
Reset power supply simultaneously for all optional controllers for centralised control.
NO
Is the power supply turned on for all optional controllers for centralised control?
NO
Turn on power supply for all optional controllers for centralised control.
YES
Is the reset switch of all optional controllers for centralised control set to "normal"?
NO
Set reset switch to "normal".
YES
Is transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
The PC board of one of the optional controllers for centralised control is defective. Try turning on/off using each optional controllers for centralised control, and replace the PC board of the one that is unable to control the indoor unit.

(VF076)

7.4 Improper Combination of Optional Controllers for Centralised Control

Remote Controller Display

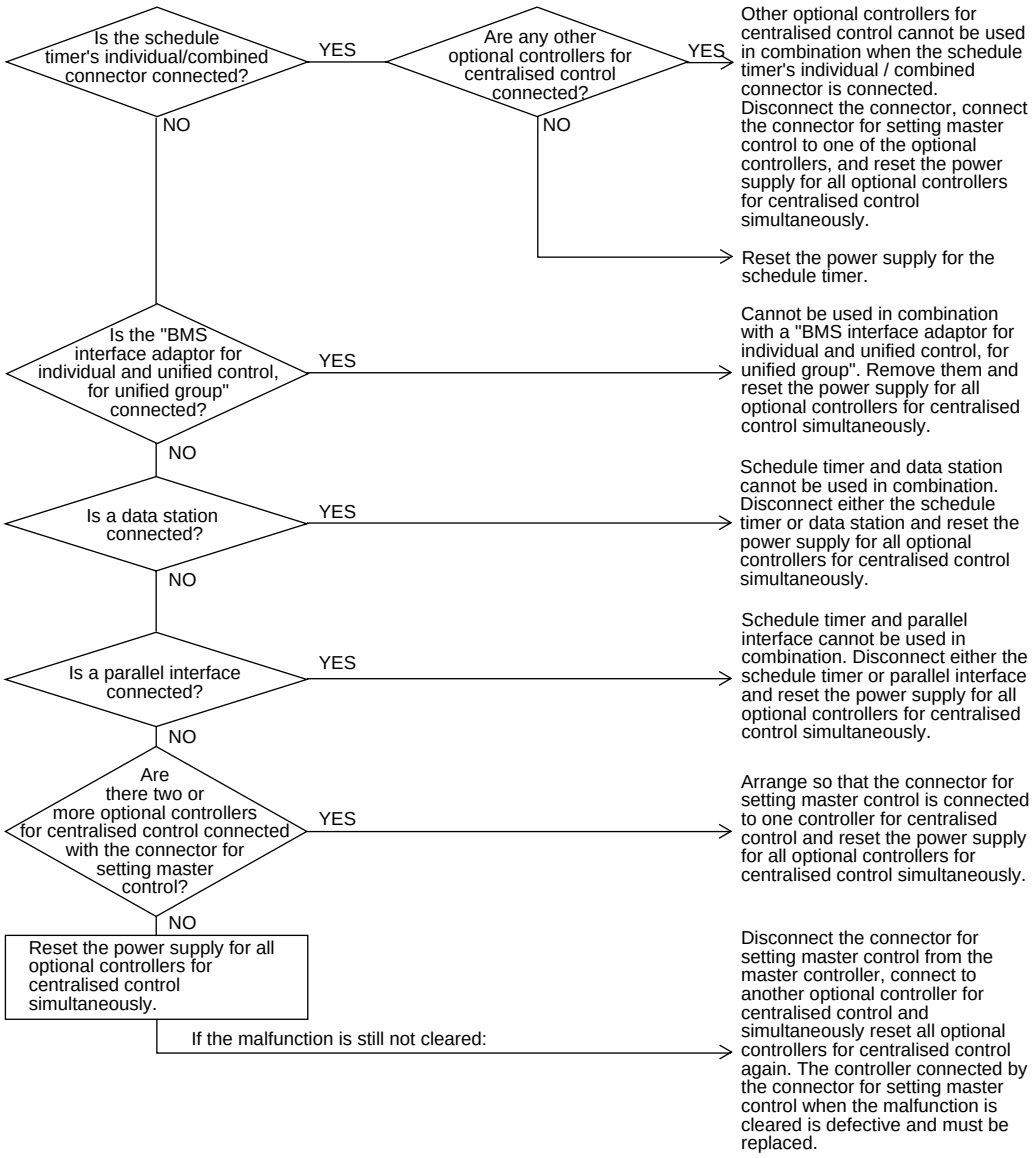
MA

Supposed Causes

- Improper combination of optional controllers for centralised control
- More than one master controller is connected.
- Defect of PC board of optional controllers for centralised control

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is the schedule timer's individual/combined connector connected?
YES
Are any other optional controllers for centralised control connected?
YES
Other optional controllers for centralised control cannot be used in combination when the schedule timer's individual / combined connector is connected. Disconnect the connector, connect the connector for setting master control to one of the optional controllers, and reset the power supply for all optional controllers for centralised control simultaneously.
NO
NO
Reset the power supply for the schedule timer.
Is the "BMS interface adaptor for individual and unified control, for unified group" connected?
YES
Cannot be used in combination with a "BMS interface adaptor for individual and unified control, for unified group". Remove them and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Is a data station connected?
YES
Schedule timer and data station cannot be used in combination. Disconnect either the schedule timer or data station and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Is a parallel interface connected?
YES
Schedule timer and parallel interface cannot be used in combination. Disconnect either the schedule timer or parallel interface and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Are there two or more optional controllers for centralised control connected with the connector for setting master control?
YES
Arrange so that the connector for setting master control is connected to one controller for centralised control and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Reset the power supply for all optional controllers for centralised control simultaneously.
If the malfunction is still not cleared:
Disconnect the connector for setting master control from the master controller, connect to another optional controller for centralised control and simultaneously reset all optional controllers for centralised control again. The controller connected by the connector for setting master control when the malfunction is cleared is defective and must be replaced.

(VF077)

7.5 Address Duplication, Improper Setting

Remote Controller Display

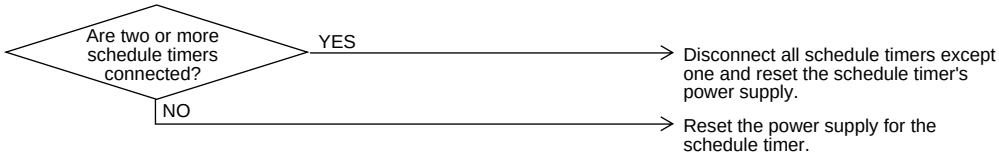
MC

Supposed Causes

- Address duplication of optional controllers for centralised control

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Are two or more schedule timers connected?
YES
Disconnect all schedule timers except one and reset the schedule timer's power supply.
NO
Reset the power supply for the schedule timer.

(VF078)

8. Troubleshooting (OP: Unified ON/OFF Controller)

8.1 Operation Lamp Blinks

Remote Controller Display

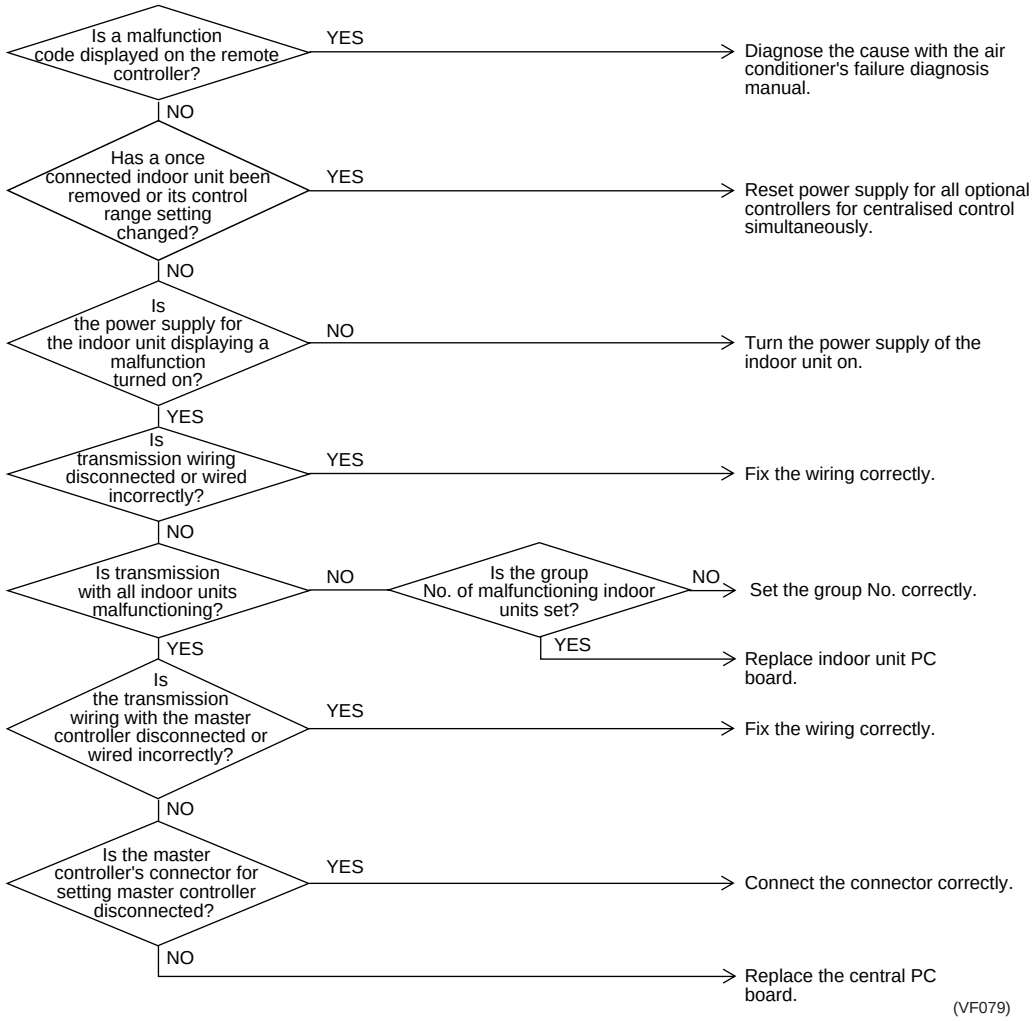
Operation lamp blinks

Suppposed Causes

- Malfunction of transmission between optional controller and indoor unit
- Connector for setting master controller is disconnected
- Defect of unified ON/OFF controller
- Defect of indoor unit PC board
- Malfunction of air conditioner

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is a malfunction code displayed on the remote controller?
YES
Diagnose the cause with the air conditioner's failure diagnosis manual.
NO
Has a once connected indoor unit been removed or its control range setting changed?
YES
Reset power supply for all optional controllers for centralised control simultaneously.
NO
Is the power supply for the indoor unit displaying a malfunction turned on?
NO
Turn the power supply of the indoor unit on.
YES
Is transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is transmission with all indoor units malfunctioning?
NO
Is the group No. of malfunctioning indoor units set?
NO
Set the group No. correctly.
YES
Replace indoor unit PC board.
YES
Is the transmission wiring with the master controller disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is the master controller's connector for setting master controller disconnected?
YES
Connect the connector correctly.
NO
Replace the central PC board.
(VF079)

8.2 Display “Under Host Computer Integrate Control” Blinks (Repeats Single Blink)

Remote Controller Display

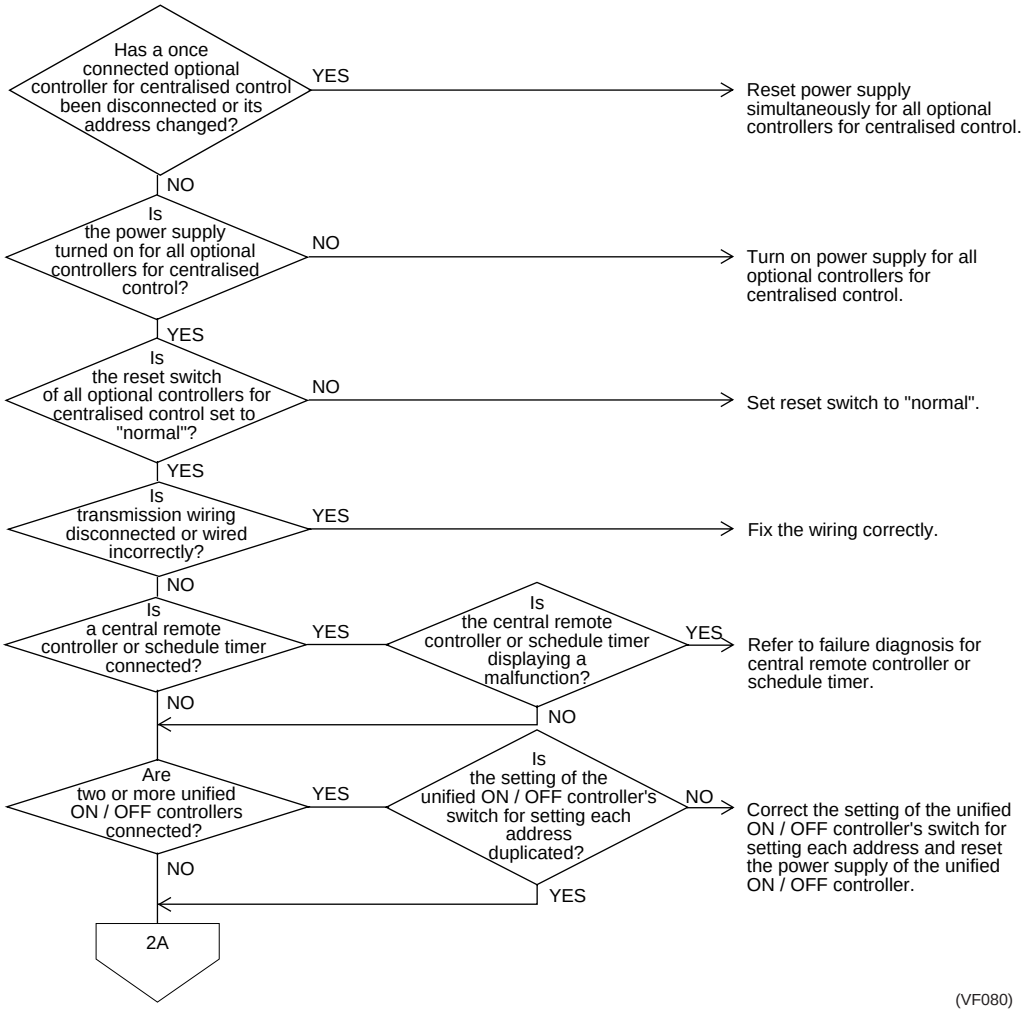
“under host computer integrated control” (Repeats single blink)

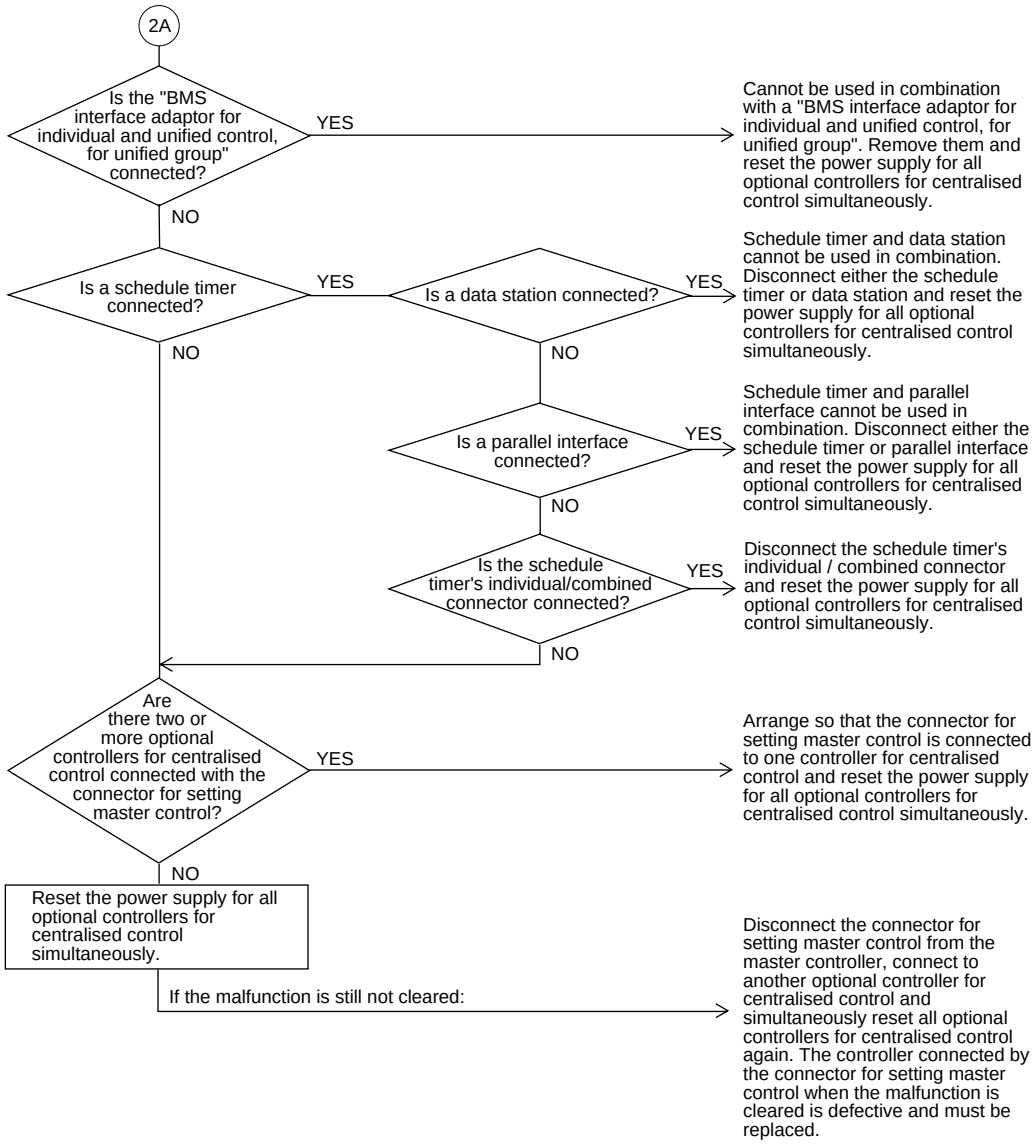
Supposed Causes

- Address duplication of central remote controller
- Improper combination of optional controllers for centralised control
- Connection of more than one master controller
- Malfunction of transmission between optional controllers for centralised control
- Defect of PC board of optional controllers for centralised control

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Has a once connected optional controller for centralised control been disconnected or its address changed?
YES
Reset power supply simultaneously for all optional controllers for centralised control.
NO
Is the power supply turned on for all optional controllers for centralised control?
NO
Turn on power supply for all optional controllers for centralised control.
YES
Is the reset switch of all optional controllers for centralised control set to "normal"?
NO
Set reset switch to "normal".
YES
Is transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is a central remote controller or schedule timer connected?
YES
Is the central remote controller or schedule timer displaying a malfunction?
YES
Refer to failure diagnosis for central remote controller or schedule timer.
NO
NO
Are two or more unified ON / OFF controllers connected?
YES
Is the setting of the unified ON / OFF controller's switch for setting each address duplicated?
NO
Correct the setting of the unified ON / OFF controller's switch for setting each address and reset the power supply of the unified ON / OFF controller.
NO
YES
2A
(VF080)


2A
Is the "BMS interface adaptor for individual and unified control, for unified group" connected?
YES
Cannot be used in combination with a "BMS interface adaptor for individual and unified control, for unified group". Remove them and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Is a schedule timer connected?
YES
Is a data station connected?
YES
Schedule timer and data station cannot be used in combination. Disconnect either the schedule timer or data station and reset the power supply for all optional controllers for centralised control simultaneously.
NO
NO
Is a parallel interface connected?
YES
Schedule timer and parallel interface cannot be used in combination. Disconnect either the schedule timer or parallel interface and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Is the schedule timer's individual/combined connector connected?
YES
Disconnect the schedule timer's individual / combined connector and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Are there two or more optional controllers for centralised control connected with the connector for setting master control?
YES
Arrange so that the connector for setting master control is connected to one controller for centralised control and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Reset the power supply for all optional controllers for centralised control simultaneously.
If the malfunction is still not cleared:
Disconnect the connector for setting master control from the master controller, connect to another optional controller for centralised control and simultaneously reset all optional controllers for centralised control again. The controller connected by the connector for setting master control when the malfunction is cleared is defective and must be replaced.

(VF081)

8.3 Display “Under Host Computer Integrate Control” Blinks (Repeats Double Blink)

Remote Controller Display

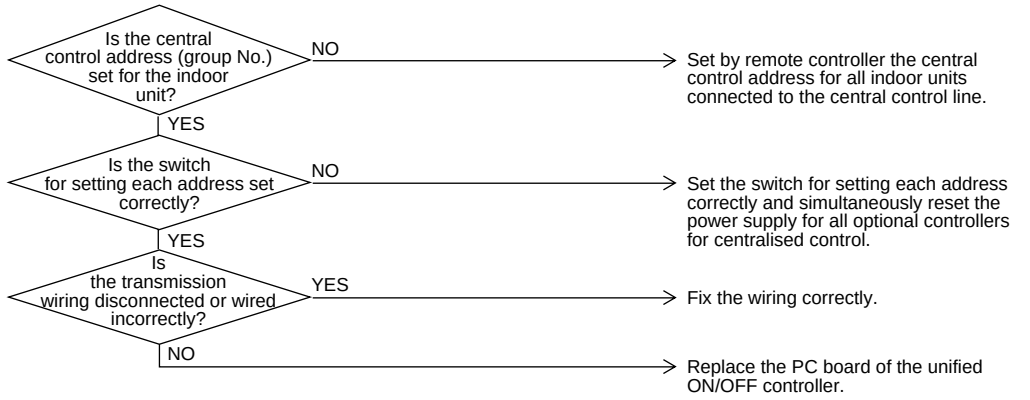
“under host computer integrated control” (Repeats double blink)

Supposed Causes

- Central control address (group No.) is not set for indoor unit.
- Improper address setting
- Improper wiring of transmission wiring

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is the central control address (group No.) set for the indoor unit?
NO
Set by remote controller the central control address for all indoor units connected to the central control line.
YES
Is the switch for setting each address set correctly?
NO
Set the switch for setting each address correctly and simultaneously reset the power supply for all optional controllers for centralised control.
YES
Is the transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Replace the PC board of the unified ON/OFF controller.

(VF082)

UM Series Using R-407C

Inverter MX1R Series
Heat Recovery ME1R Series

Part 1
General Information

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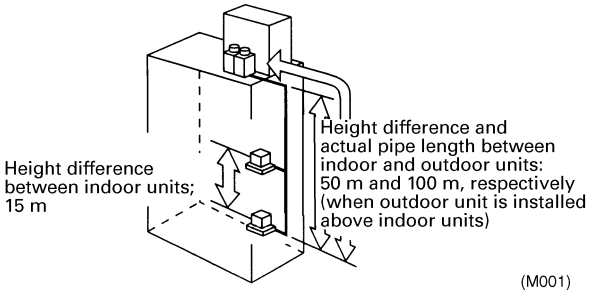
1. Introduction

1.1 Introduction of the Series

Incorporating advanced inverter and multi-unit technologies, UM Series air conditioning systems for buildings allow individual control of indoor units for added versatility.

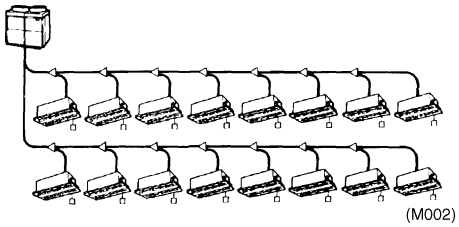
- **Long refrigerant piping: equivalent length of 125 m, actual length of 100 m, and height difference of 50 m.**
- Connection of indoor units of varying capacities and types totaling 130% (max.) of outdoor unit by volume

∗ When the total capacity of indoor units exceeds 100% (by volume), the operating capacities of the indoor units may slightly drop when all the units operate simultaneously.



- High efficiency with power factor of 90% or higher
- Cooling operation with outside temperature as low as –5°C
- Heating operation with outside temperature as low as –15°C
- Simple Branch piping system
- Super Wiring system

- **Individual control of up to 16 indoor units with one 10HP outdoor unit**



Outdoor unit	Number of connectable indoor units
CU-5MX	8
CU-8MX	13
CU-10MX	16

- Automatic address setting function
- Built-in wiring error check function
- Equipped with sequential instruction function
- Nighttime low-noise mode for reduced operating sound

2. Outline

2.1 MX1R Series

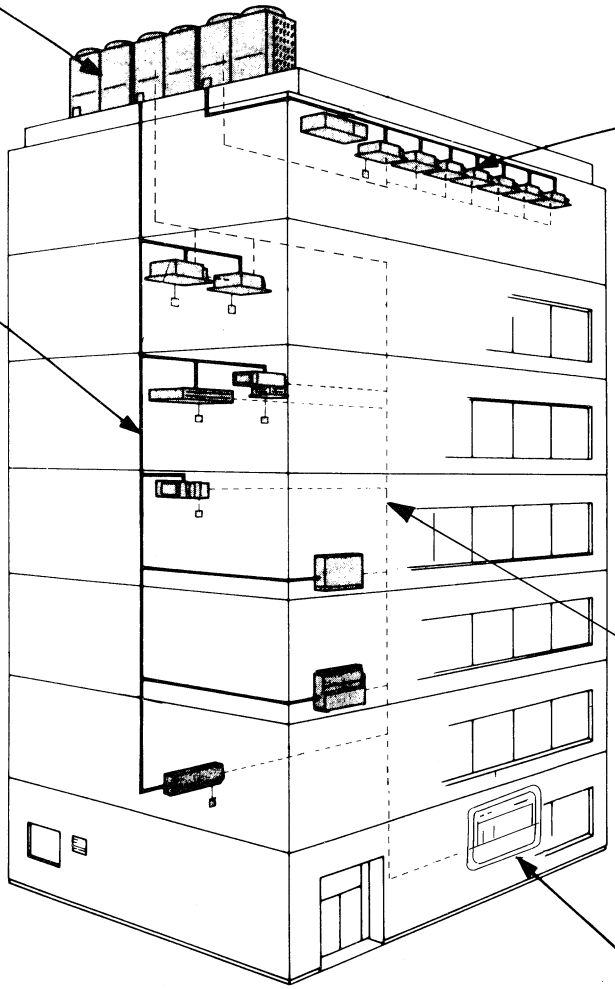
UM Inverter "MX1R Series"

Outdoor unit

*Piping run from three directions.
*Equipped with automatic indoor / outdoor unit wiring and piping check function.

Branch piping system

*100 meters long refrigerant piping.
*Handles 15~16-story buildings with 50 meters level difference.
(40 m when outdoor unit is below.)



Indoor unit

*Wide selection including 10 types and 61 models.
*Up to 16 units can be connected to a single system.
*Minimum capacity equivalent to 0.8 HP.

* 5HP 8units
8HP 13units
10HP 16units

New transmission system

*Same wiring can be used for transmission between indoor/outdoor units and centralised control (no polarity).
*Wiring length up to 1,000 meters
(Total wiring length up to 2,000 meters)

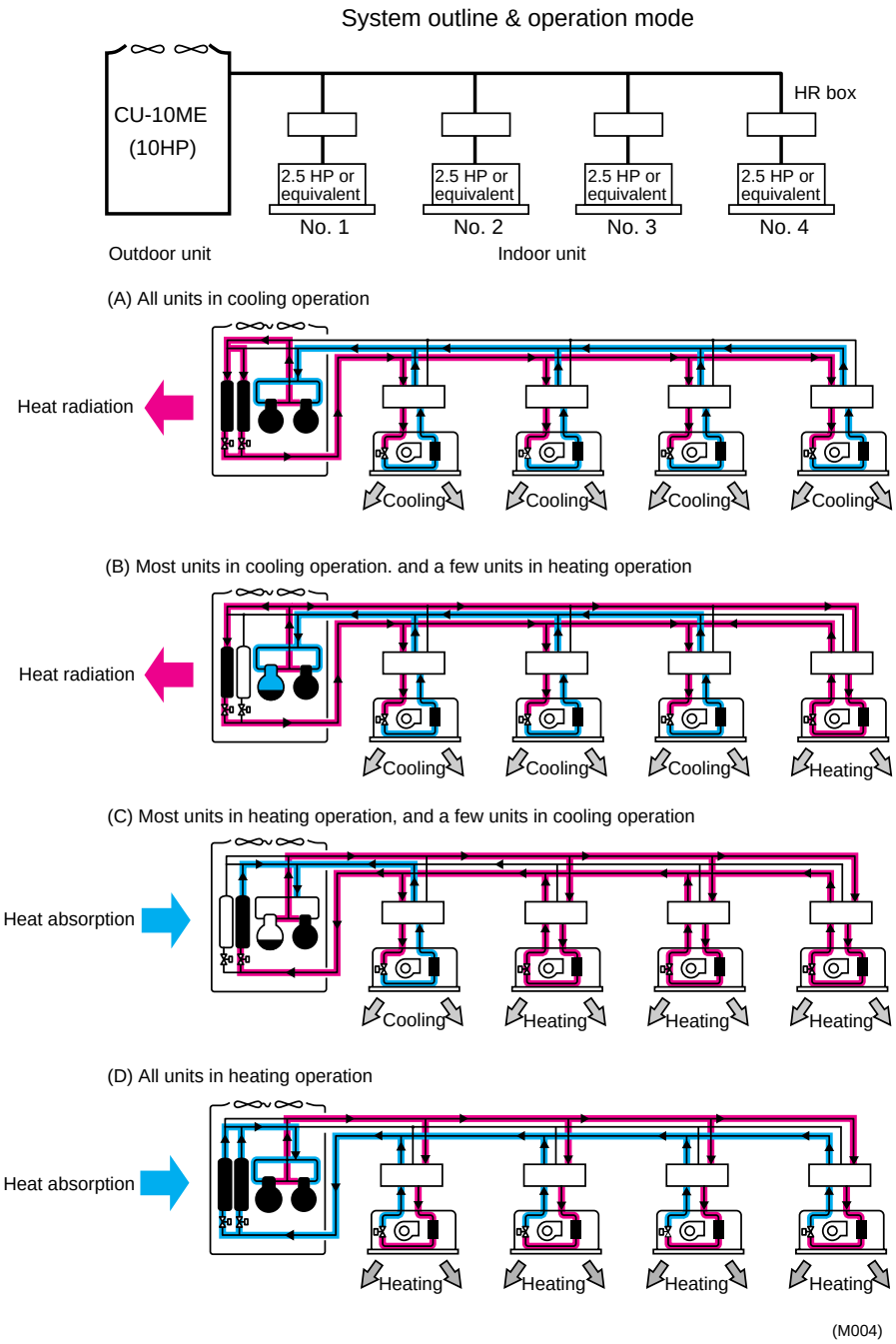
New centralised system

*128 units can be connected for individual control (if using 2 central remote controllers).

(M003)

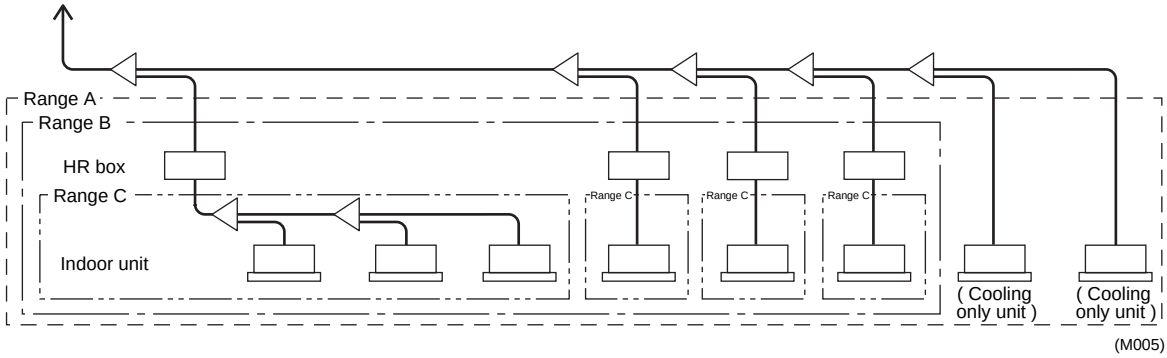
2.2 ME1R Series (Heat Recovery)

- Allows individual control of different types of indoor units with varying capacities totaling 50 to 130% of the outdoor unit capacity.
  ∗ When total indoor capacity exceeds 100%, indoor unit operating capacity may decrease slightly if all indoor units are operated at the same time.
- Indoor units ranging from the smallest 20 type (0.8 HP).
- Flexible refrigerant piping: equivalent length of 125 m, actual length of 100 m, outdoor unit height difference of 50 m, and height difference of 15 m between indoor units.



∗ Outside temperature of 35°C for operation mode (A), 0°C for operation mode (D), and typical seasonal outside temperatures for others.

2.3 Allowed Range of Indoor Unit and HR Box Connection



■ Arrange systems to conform below conditions referring to above diagram.

Range	Item	Model of outdoor unit and HR box	Total capacity of connectable indoor units	Max. number of connectable indoor units
Range A	Total indoor unit capacity	CU-8ME1XPK	11.2 to 29.1kW	13 units
		CU-10ME1XPK	14 to 36.4kW	16 units
Range B	Total indoor unit capacity allowed for simultaneous cooling/heating operations	CU-8ME1XPK	11.2kW or more	13 units
		CU-10ME1XPK	14kW or more	16 units
Range C	Total indoor unit capacity allowed for connection to HR box	CZ-100HR1HP	less than 11.2kW	5 units or less
		CZ-160HR1HP	11.2 to 18kW	6 units or less

Part2 Function

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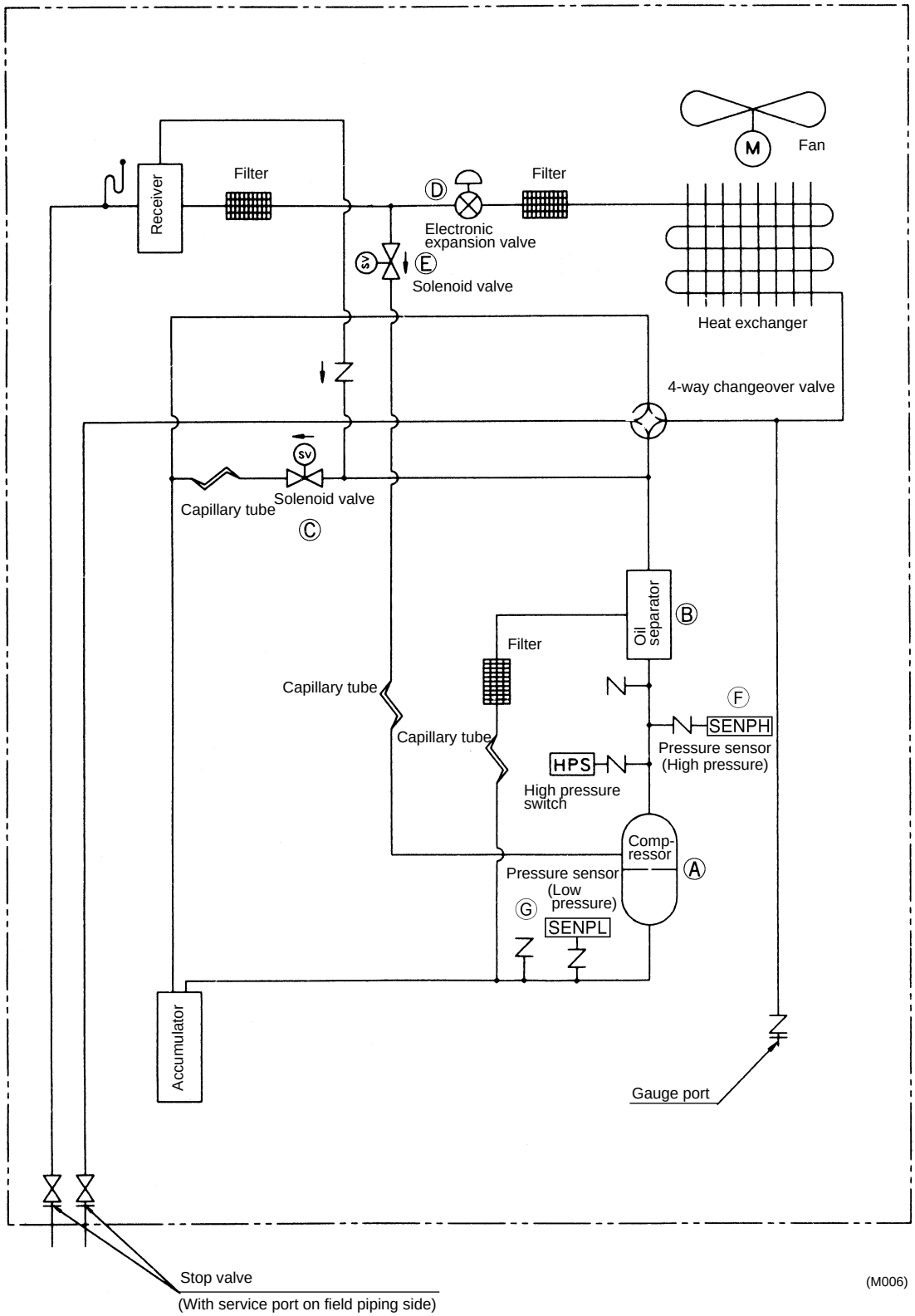
1. Function

1.1 Outdoor Unit Refrigerant System Diagram

1.1.1 CU - 5MX1SPP



A. Compressor M1C

Scroll compressor that operates on 30 ~ 116Hz by inverter drive enables 13-step capacity control.
Capacity control is carried out for individual and linear control of indoor units.

B. Oil separator

The oil separator is a device that collects the oil discharged from the compressor.
The collected oil is constantly recycled to the compressor via capillary tube.

C. Solenoid valve (hot gas bypass) Y2S

Valve is opened by low pressure safety control when low pressure drops.
Balances high/low pressure when off in order to reduce load when the compressor starts.

D. Outdoor unit electronic expansion valve Y1E

Expansion valve when heating. Senses compressor suction pipe and low pressure equivalent saturated temperature, and carries out superheat degree control.
Balances high/low pressure when off in order to reduce load when the compressor starts.

E. Solenoid valve (injection) Y3S

Controls injection in order to prevent overheating.

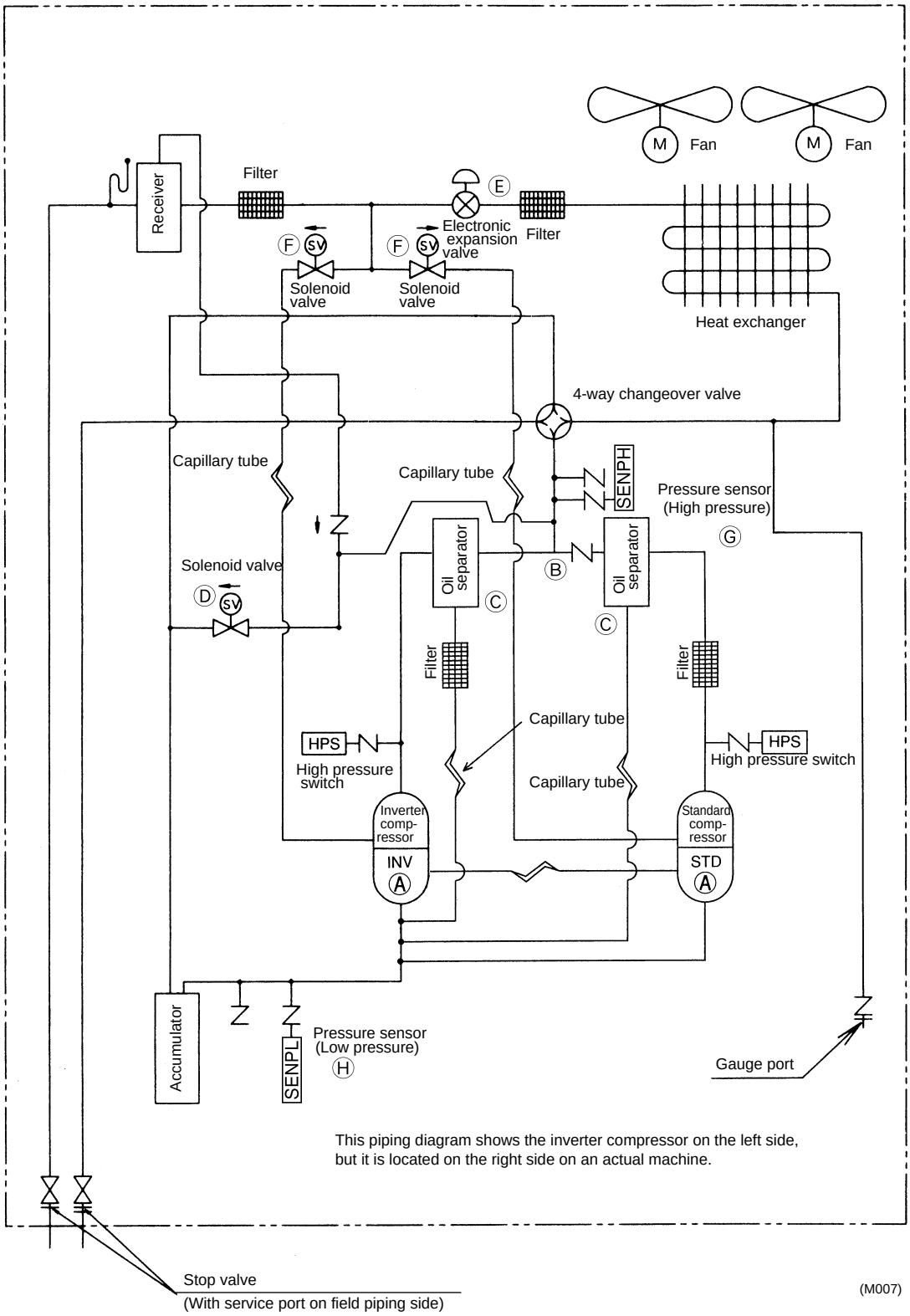
F. Pressure sensor (high pressure, red) SENPH

Semiconductor pressure sensor for sensing the operating status of the indoor by refrigerant pressure which senses discharge pressure.

G. Pressure sensor (low pressure, blue) SENPL

Semiconductor pressure sensor for sensing the operating status of the indoor by refrigerant pressure which senses suction pressure.

1.1.2 CU-8·10MX1SPP



A. Compressor M1C / M2C

Connecting a scroll compressor (inverter compressor) that operates on 30 ~ 116Hz by inverter drive and a scroll compressor (standard compressor) that runs on a commercial power supply to the same refrigerant system enables 21-step capacity control. Capacity control is carried out for individual and linear control of indoor units.

(M1C: Inverter compressor, M2C: Standard compressor)

B. Check valve

Keeps liquid refrigerant from collecting in the standard compressor when only the inverter compressor is running.

C. Oil separator

The oil separator is a device that collects the oil discharged from the compressor. The collected oil is constantly recycled to the compressor via capillary tube.

D. Solenoid valve (hot gas bypass) Y2S

Balances high/low pressure when off in order to reduce load when the compressor starts.

Also, valve is opened by low pressure safety control when low pressure drops.

E. Outdoor unit electronic expansion valve Y1E

Expansion valve when heating. Senses compressor suction pipe and low pressure equivalent saturated temperature, and carries out superheat degree control.

F. Solenoid valve (injection) Y3S / Y4S

Controls injection in order to prevent overheating.

Y3S: Inverter compressor, Y4S: Standard compressor)

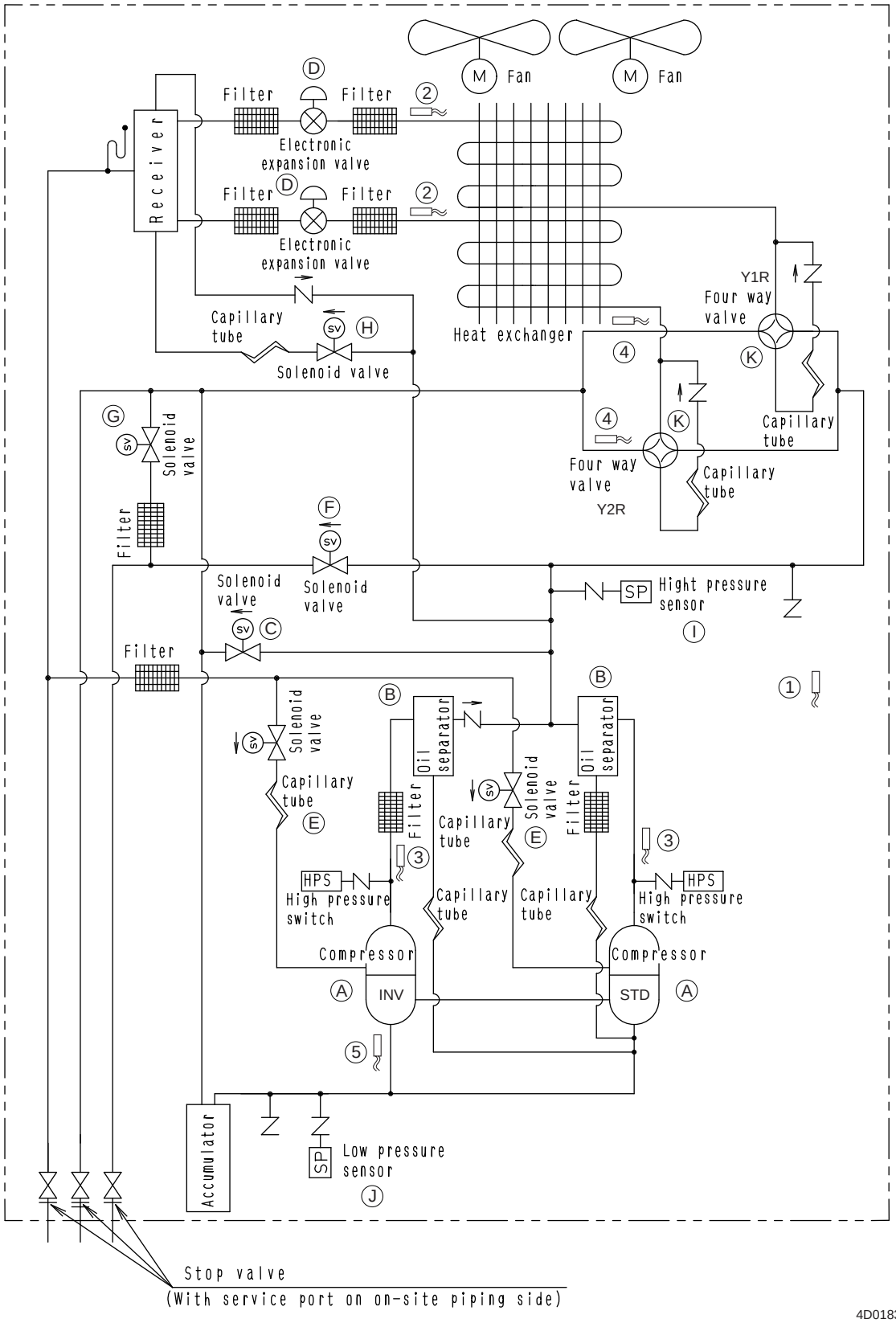
G. Pressure sensor (high pressure, red) SENPH

Semiconductor pressure sensor for sensing the operating status of the indoor by refrigerant pressure which senses discharge pressure.

H. Pressure sensor (low pressure, blue) SENPL

Semiconductor pressure sensor for sensing the operating status of the indoor by refrigerant pressure which senses suction pressure.

1.1.3 CU-8·10 ME1XPK (Heat Recovery)

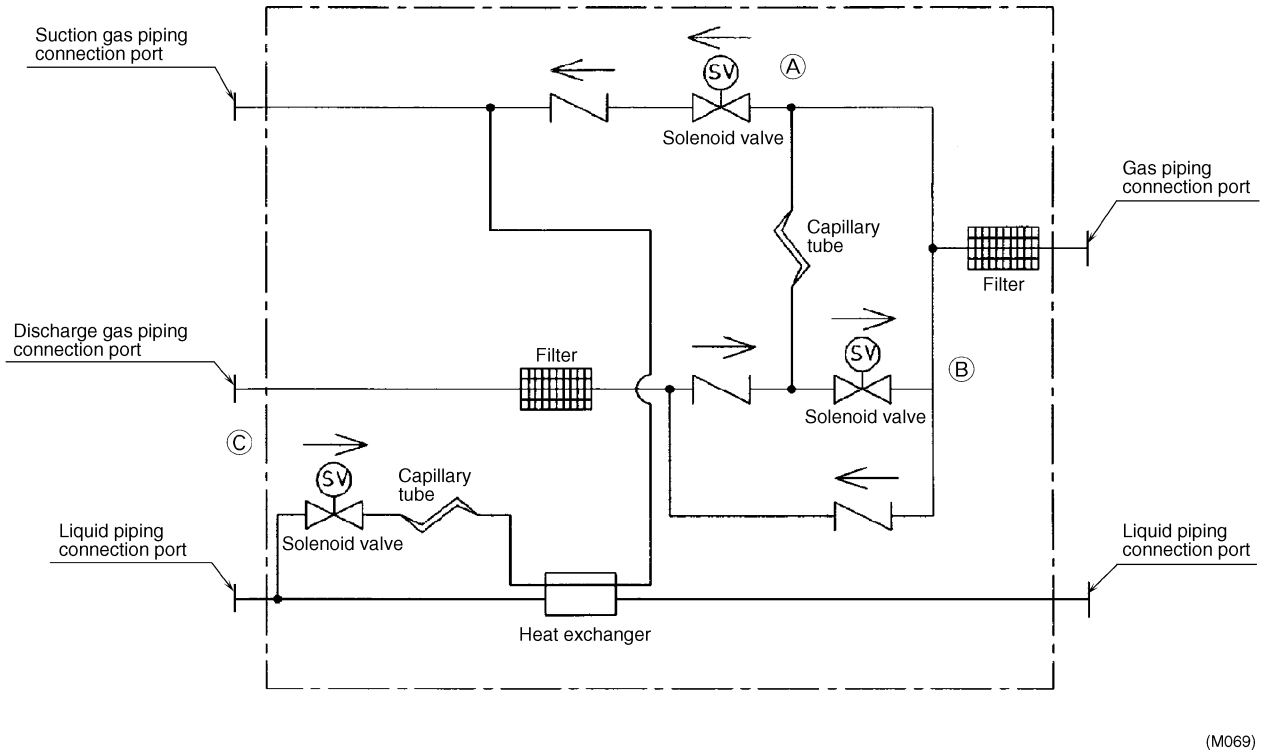


4D018352

A. Compressor
The 20-step capacity control is achieved by the inverter scroll compressor that uses an inverter for frequency control in a range of 32 to 116 Hz and the standard scroll compressor that uses commercial power supply. The compressors allow individual control of indoor units and linear control.
(M1C : inverter compressor, M2C : standard compressor)
B. Oil separator
This device collects oil discharged from the compressors. The device receives oil and sends recovered oil to the compressors through the capillary tube.
C. Solenoid valve (for hot gas bypass) Y2S
This valve maintains balance between the high and low pressure sides when the equipment stops, thus reducing compressor load in the next startup.
This valve is activated by a low-pressure protection control function and opens when the low-pressure side decreases in pressure.
D. Outdoor unit electronic expansion valves Y1E, Y2E
These expansion valves are activated during heating operation.
They detect the compressor suction pipe temperature and low pressure equivalent saturation temperature and control superheat.
(Y1E : for primary-side heat exchanger, Y2E : for secondary-side heat exchanger)
E. Solenoid valve (injection) Y3S, Y4S
Controls injection solenoid valve ON-OFF in order to prevent overheating.
Y3S : for inverter side compressor
Y4S : for standard side compressor
F. Solenoid valve (discharge gas) Y5S
Valve is opened during heating and simultaneous cooling and heating operations.
G. Solenoid valve (for pressure equalization) Y1S
This valve maintains pressure balance before and after the HR box solenoid valve during cooling and heating operation mode change.
H. Solenoid valve (for liquid pressure) Y6S
This valve opens a bypass to send hot gas to the receiver and controls the liquid pressure.
I. Pressure sensor (high pressure ⋯ red) SENPH
This semiconductor pressure sensor detects discharge pressure. The detected refrigerant pressure is used to evaluate the operation conditions of indoor units.
Heating operation ⋯ The sensor detects high pressure and controls the compressor capacity.
J. Pressure sensor (low pressure ⋯ blue) SENPL
This semiconductor pressure sensor detects suction pressure. The detected refrigerant pressure is used to evaluate the operation conditions of indoor units.
Cooling operation ⋯ The sensor detects low pressure and controls the compressor capacity.
Heating operation ⋯ The sensor provides superheat control.
K. 4-way valves Y1R, Y2R
(Y1R : for primary-side heat exchanger, Y2R: for secondary-side heat exchanger)
1. Outside temperature thermistor R1T
Heating operation ⋯ Used as a function of defrost IN condition.
The thermostat turns off when the temperature exceeds 23°C.
2. Coil temperature thermistors R2-1T, R2-2T
(R2-1T : for primary-side heat exchanger, R2-2T : for secondary-side heat exchanger)
Cooling operation ⋯ Not used.
Heating operation ⋯ Used as a function of defrost IN condition, in combination with the outside temperature data.
3. Discharge temperature thermistors R3-1T, R3-2T
These thermistors are used for compressor discharge temperature protection.
(R3-1T : inverter compressor, R3-2T : standard compressor)
4. Suction pipe temperature thermistors R4-1T, R4-2T
These thermistors are used for compressor discharge temperature protection.
(R4-1T : for primary-side heat exchanger, R4-2T : for secondary-side heat exchanger)
5. Oil temperature thermistor R5T
During defrost and oil return operation, provides upper-limit frequency control to improve oil diluting condition.

1.1.4 HR box

CZ-100HR1HP



A. Solenoid valve (suction side) Y2S
This solenoid valve turns ON when normal cooling operation and discharge/suction oil return operation. (Connect indoor unit gas pipe and outdoor unit suction pipe.)

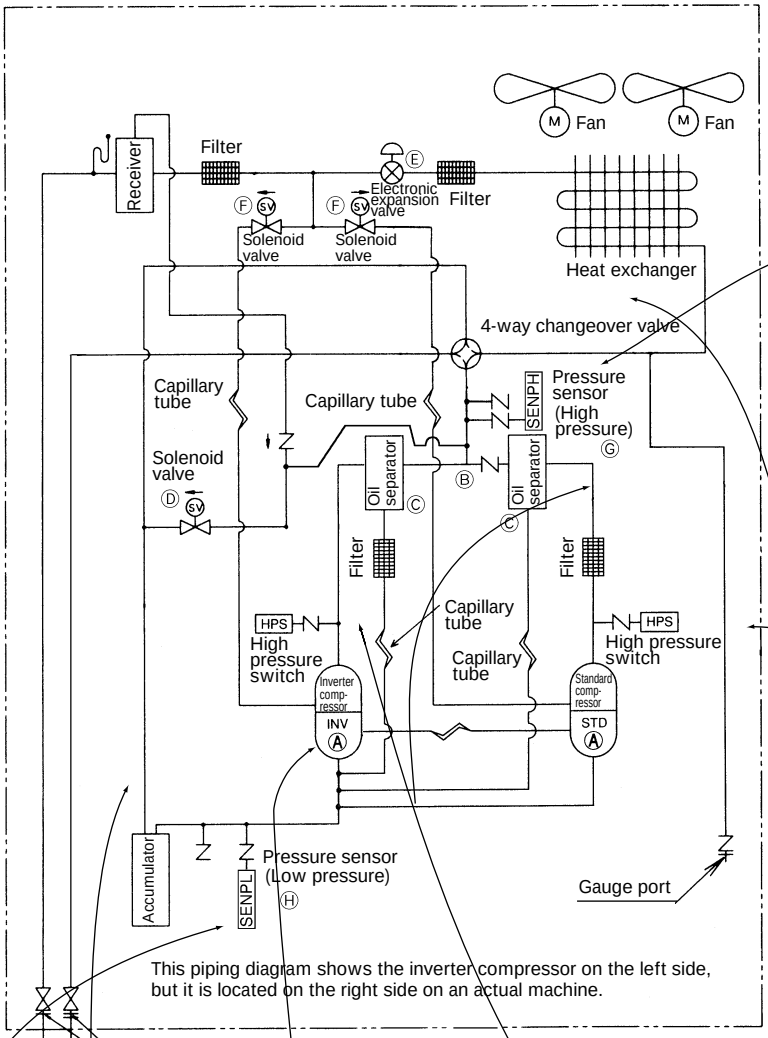
B. Solenoid valve (discharge side) Y3S
Turn ON this valve to operate of discharge oil return when indoor unit is set for heating. (Connect indoor unit gas pipe and outdoor unit discharge pipe.)

C. Solenoid valve (Drift prevention injection) Y1S
The only valve in HR box of which indoor unit is in heating operation when simultaneous cooling/heating operation is applied in the same system

∗ **Impossible to replace solenoid valve main body.**

1.1.5 Function of Thermistors and Pressure Sensors

Outdoor unit
CU-8·10MX1SPP



High pressure sensor (SENPH)
When heating:
Used for compressor capacity control by sensing high pressure.
When cooling:
Carries out heat exchange control during low outdoor air cooling.

Outdoor temperature thermistor (R1T)
(When heating)
- Used as the function for defrost IN conditions.
- OFF by thermostat when temperature becomes 27 C or higher

Suction pipe temperature thermistor (R4T)
Used for superheat control of electronic expansion valve when heating.

Discharge pipe temperature thermistor
R3-1T (Inverter compressor)
R3-2T (Standard compressor)
Used for compressor discharge temperature safety.

Coil temperature thermistor (R2T)
(When cooling)
Not used for anything.
(When heating)
Used together with outdoor temperature as the function for defrost IN conditions.

Low pressure sensor (SENPL)
When heating:
Used for compressor capacity control and low pressure safety control by sensing high pressure.
When cooling:
Used for overheating control and low pressure safety control.

Oil temperature thermistor (R5T)
(8, 10 HP only)
(When heating)
- Alters the desired superheat degree (SH) to prevent wet operation.

(When defrosting)
- Controls upper limit frequency to improve dilution of oil.

(M008)

1.2 List of Safety Devices and Functional Parts Setting Values

1.2.1 CU-5·8·10MX1SPP

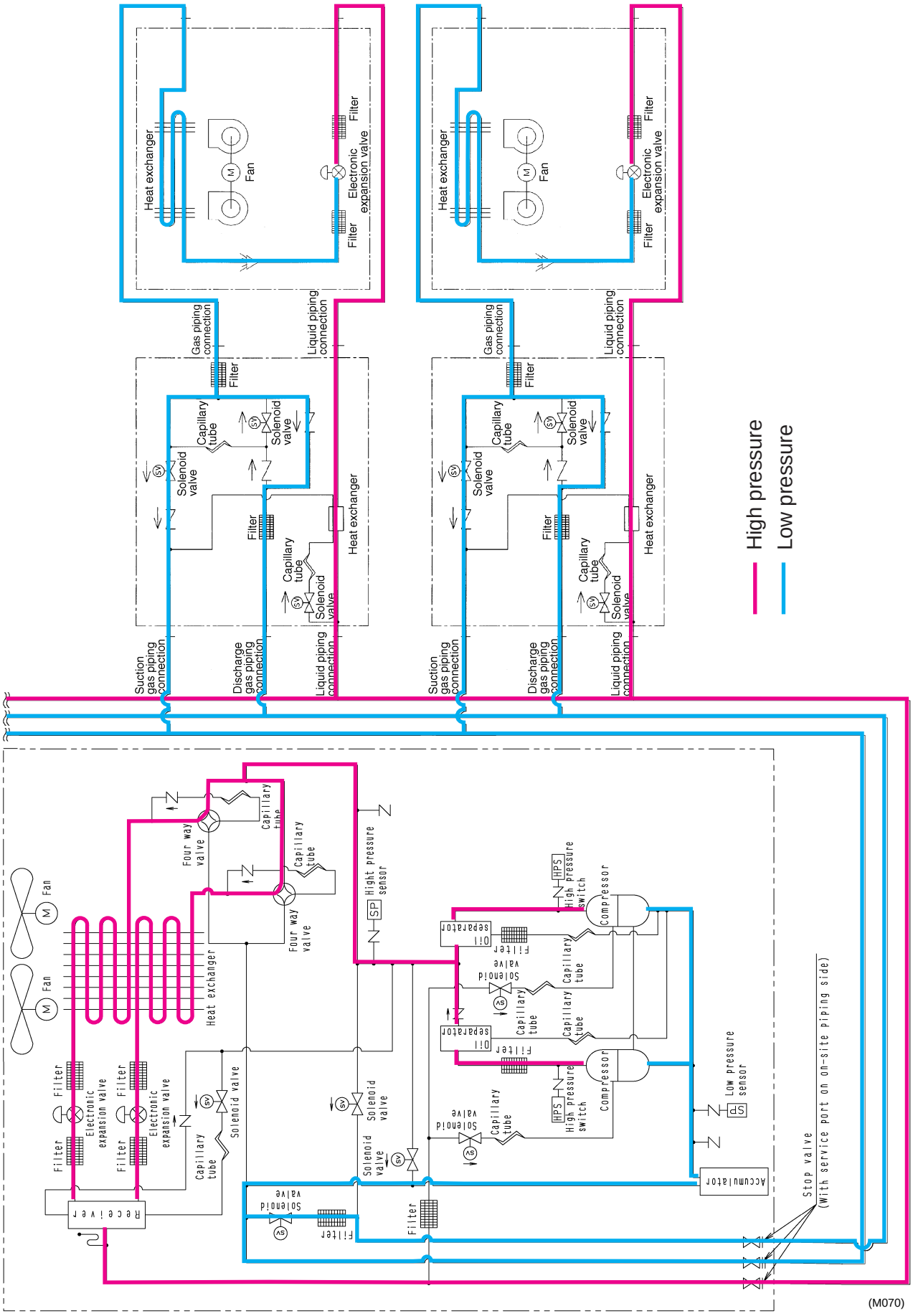
Item	Symbol	Name		Type		
				CU-5MX1SPP	CU-8MX1SPP	CU-10MX1SPP
Comp-ressor		Inverter side Model Output		JT100BEVYE 3.5 kW	JT100BEVTYE 3.5 kW	JT100BEVTYE 3.5 kW
		Standard side		—	JT100BETYE 2.2 kW	JT160BETYE 3.75 kW
		Compressor safety thermostat		Discharge pipe thermistor 135°C OFF		
	J1HC/ J2HC	Crank case heater		33W	33W+33W	
	F2C	Over-current relay		—	HOE-20F-TRA1 10A	HOE-20F-TRA1 13A
Safety device	Q1M Q2M	Fan motor		190W	140W+230W	190W+230W
		Safety thermostat		Open 135 ± 5°C	140 W: Open 120 ± 5°C, 190W: 135 ± 5°C, 230 W: 135 ± 5°C	
	S1P	Pressure switch (for high pressure safety)		20SP-688-6 OFF:31.5+0~-1.0kg/cm^2 ON:22.0+1.0~-1.0kg/cm^2	—	
	S1PH	Pressure switch (for high pressure safety)		—	20SP - 688 - 6 OFF:31.5+0~-1.0kg/cm^2 ON:22.0+1.0~-1.0kg/cm2	
	S2PH	Pressure switch (for high pressure safety)		—	20SP - 688 - 6 OFF:31.5+0~-1.0kg/cm^2 ON:22.0+1.0~-1.0kg/cm^2	
		Fusible plug		FPG-3D 7~75°C		
Sensor	SENPH	Pressure sensor		PS8030A 0~34kg/cm^2 (0~3.3MPa)		
	SENPL	Pressure sensor		PS8030A 0~10kg/cm^2 (0~0.98MPa)		
	R1T	Thermistor (for outdoor air)		3.5~360KΩ		
	R2T	Thermistor (for heat exchange)		3.5~400KΩ		
	R3T	Thermistor (for discharge pipe)		3.5~400KΩ	—	
	R3-1T	Thermistor (for inverter discharge pipe)		—	3.5~400KΩ	
	R3-2T	Thermistor (for standard discharge pipe)		—	3.5~400KΩ	
	R4T	Thermistor (for suction pipe)		3.5~360KΩ		
	R5T	Thermistor (for inverter oil temperature)		—	3.5~400KΩ	
Other functions /parts	Y1E	Electronic expansion valve	When cooling	ON: 2,000 pulses (completely open); OFF: 0 pulses (completely closed)		
			When heating	ON: PI control; OFF: 0 pulses (completely closed)		
	Y2S	Solenoid valve (for hot gas bypass)		NEV603		
	Y3S	Solenoid valve (for inverter injection)		NEV202		
	Y4S	Solenoid valve (for standard injection)		—	NEV202	

1.2.2 CU-8·10 ME1XPK

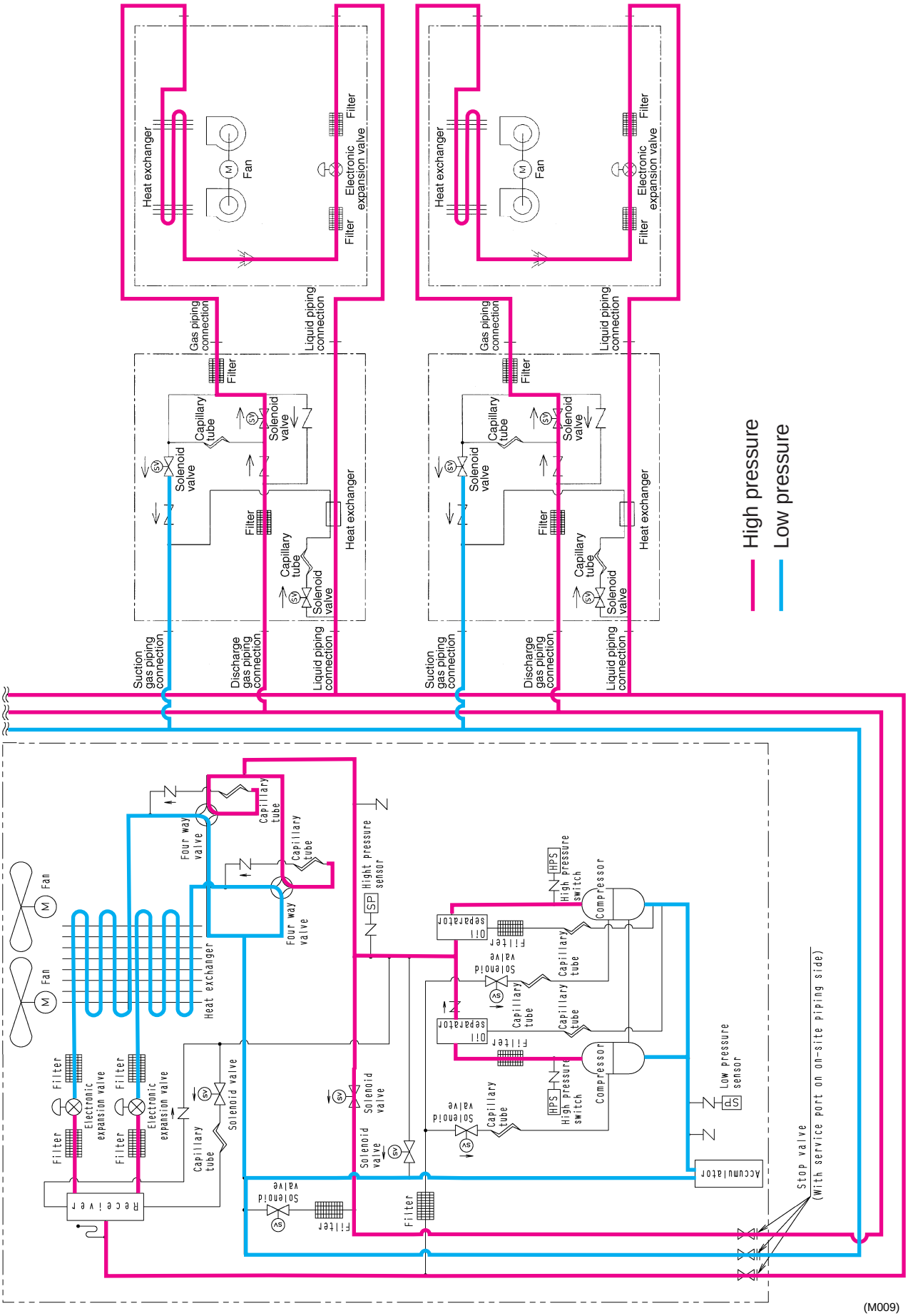
Item	Symbol	Name			Type	
					CU-8ME1XPK	CU-10ME1XPK
Comp-ressor		Inverter side Model Output	3ϕ, 380~415V	INV	JT100BAVTYE 3.5 kW	JT100BAVTYE 3.5 kW
				STD	JT100BATYE 2.2 kW	JT160BATYE 3.75kW
		Compressor safety thermostat			Discharge pipe thermistor 135°C OFF	
	J1HC/ J2HC	Crank case heater			33W+33W	
	F2C	Over-current relay	3ϕ, 380~415V		HOE-20F-TRA1 10A	HOE-20F-TRA1 13A
Safety device	Q1M Q2M	Fan motor			140W+230W	190+230W
		Safety thermostat			140W: Open 120 ± 5°C, 190W: 135°± 5°C, 230W: 135 ± 5°C	
	S1PH	Pressure switch (for high pressure safety)			20SP-688-8 OFF: 3.09 $^{+0}_{-0.1}$ MPa ON: 2.16±0.1MPa	
	S2PH	Pressure switch (for high pressure safety)			20SP-688-8 OFF: 3.09 $^{+0}_{-0.1}$ MPa ON: 2.16±0.1MPa	
		Fusible plug			FPG-3D 70~75°C	
Sensor	SENPH	Pressure sensor			PS8030A 0~3.3MPa	
	SENPL	Pressure sensor			PS8030A 0~10kg/cm² (0~0.98MPa)	
	R1T	Thermistor (for outdoor air)			3.5~360KΩ	
	R2-1T R2-2T	Thermistor (for heat exchange)			3.5~360KΩ	
	R3-1T	Thermistor (for inverter discharge pipe)			3.5~400KΩ	
	R3-2T	Thermistor (for standard discharge pipe)			3.5~400KΩ	
	R4-1T R4-2T	Thermistor (for suction pipe)			3.5~360KΩ	
	R5T	Thermistor for inverter oil temperature)			3.5~360KΩ	
Other functions /parts	Y1E	Electronic expansion valve		When cooling	ON: 2,000 pulses (Fully open); OFF: 0 pulses (Fully closed)	
				When heating	ON: PI control; OFF: 0 pulses (Fully closed)	
	Y1S	Solenoid valve (pressure equalizing)			BPV-1706	
	Y2S	Solenoid valve (for hot gas bypass)			NEV603	
	Y3S	Solenoid valve (for inverter injection)			NEV202	
	Y4S	Solenoid valve (for standard injection)			NEV202	
	Y5S	Solenoid valve (for discharge gas)			SEV-1506	
	Y6S	Solenoid valve (for liquid pressure)			NEV603	

1.3 Flow of Refrigerant in Each Operation Mode (ME1R Series)

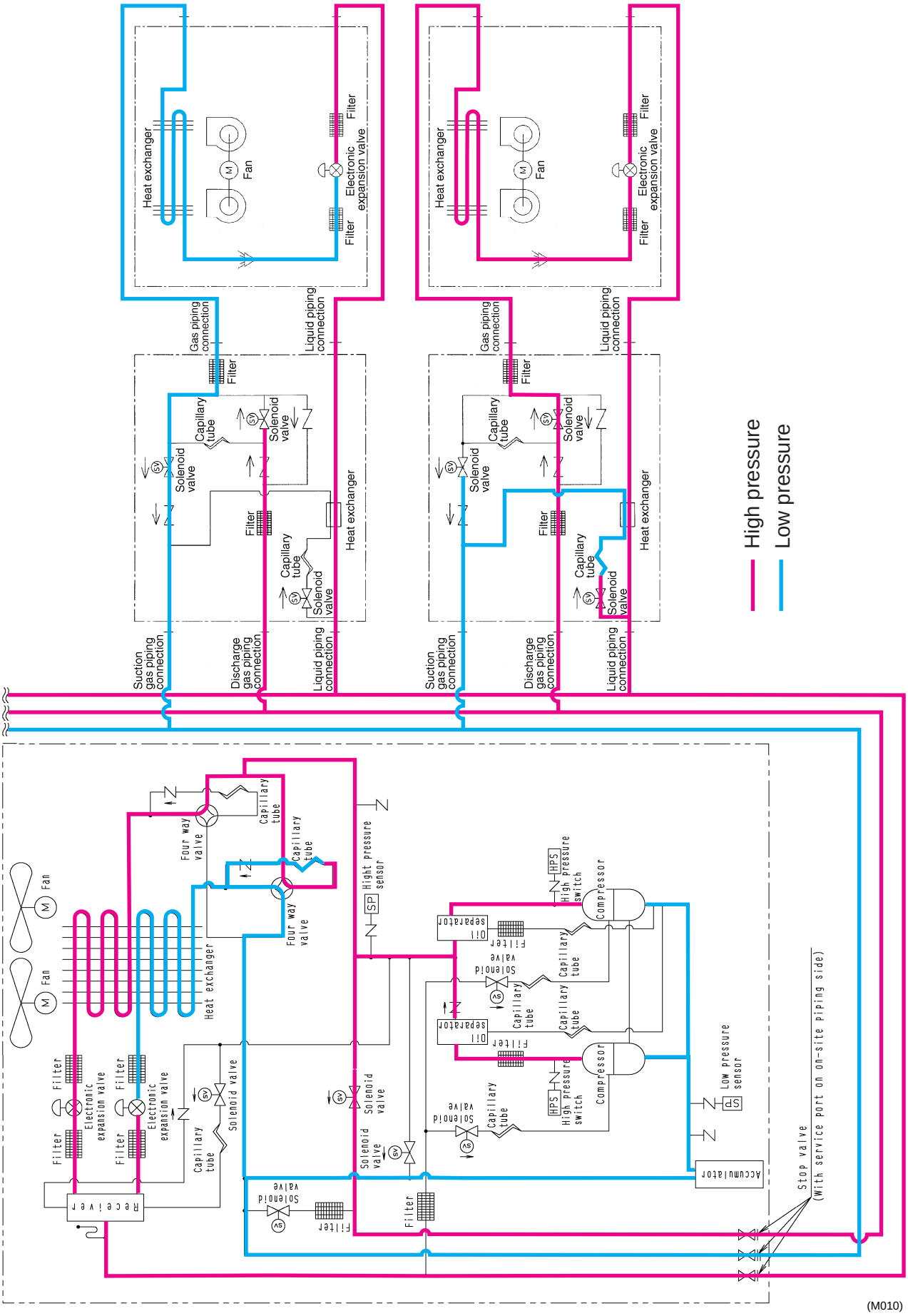
1.3.1 Cooling



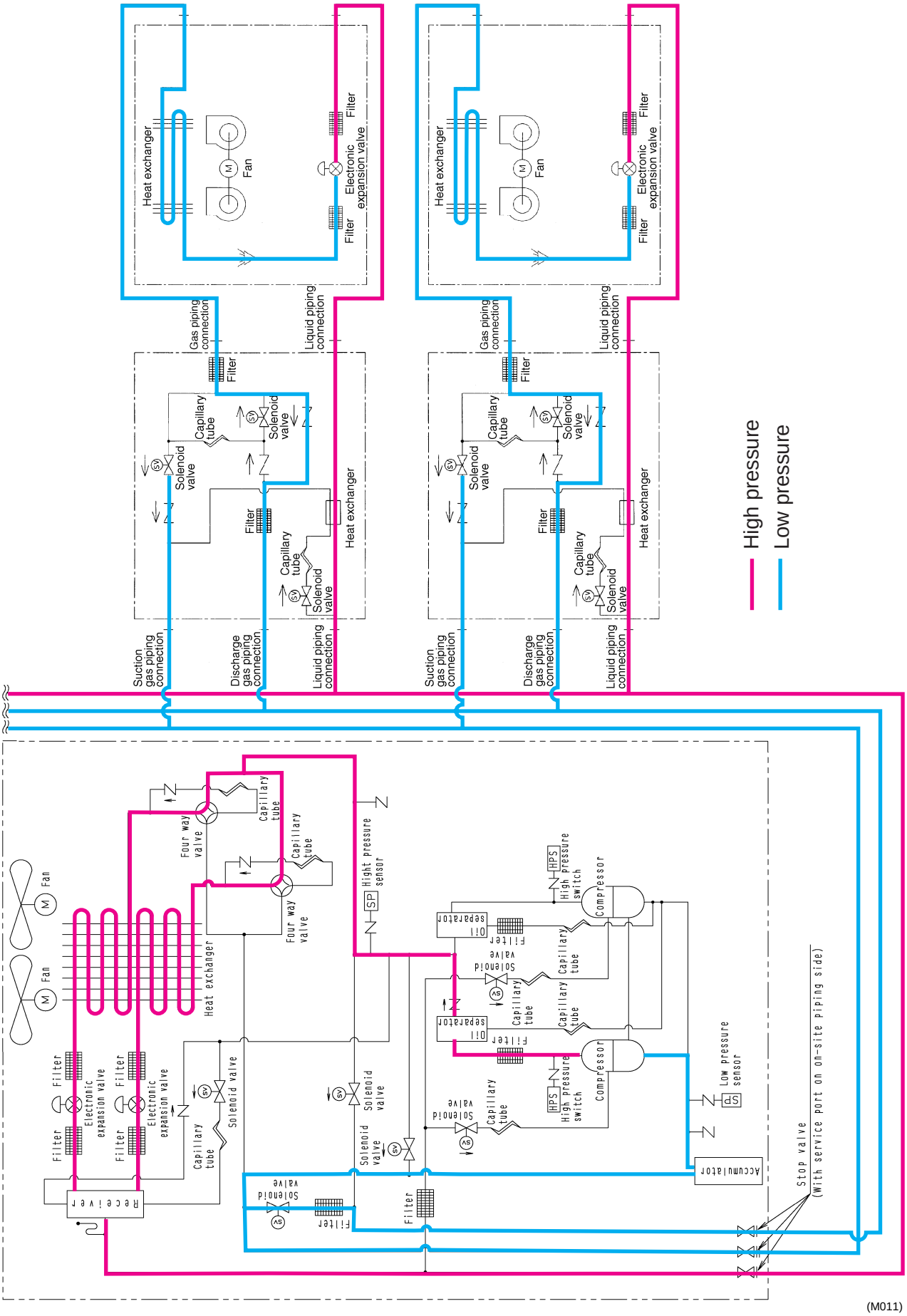
1.3.2 Heating


Heat exchanger
Fan
Filter
Electronic expansion valve
Gas piping connection
Liquid piping connection
Capillary tube
Solenoid valve
Heat exchanger
Suction gas piping connection
Discharge gas piping connection
High pressure
Low pressure
Four way valve
Hight pressure sensor
HPS
High pressure switch
Compressor
Oil separator
Low pressure sensor
Accumulator
Receiver
Stop valve
(With service port on on-site piping side)
(M009)

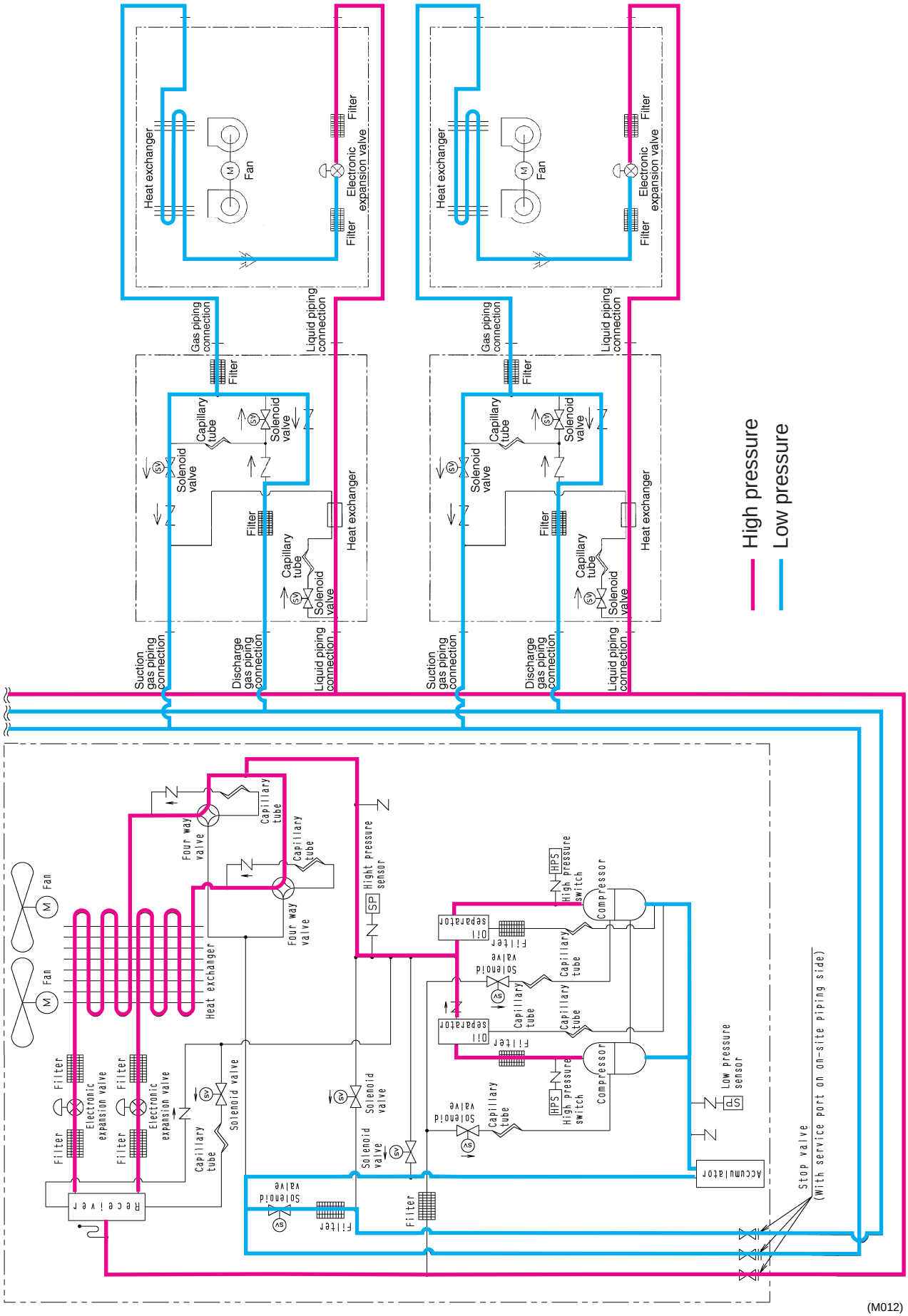
1.3.3 Simultaneous Cooling and Heating



1.3.4 Discharge Oil Return, Defrost



1.3.5 Suction Oil, Defrost



1.4 Outline of Control (ME1R Series)

1.4.1 Inverter Compressor, Motorized PI Control

1. Compressor PI control

- Cooling operation
  Controls TeS (target Te value) at constant ⋯ Constant-level control of Te (low pressure equivalent saturation temperature)
  TeS = 7.5°C
- Heating operation
  Controls TcS (target Tc value) at constant ⋯ Constant-level control of Tc (high pressure equivalent saturation temperature)
  TcS = 48°C
- Simultaneous cooling/heating operations
  Controls TeS and TcS at constant
  TeS = 7.5°C
  TcS = 48°C

∗ TeS setting values

L	M (Factory setting)	H
4.5	7.5	10.5

* TcS setting values

L	M (Factory setting)	H
45	48	51

2. Motorized valve PI control

Provides PI control for the motorized valves (Y1E and Y2E) to maintain a constant superheat (SH) level at the outlet of the outdoor heat exchanger (evaporator).
SHs = Ts - Te
SHs = 5°C
∗ Ts1 :Suction pipe temperature (R4-1T)
Ts2: Suction pipe temperature (R4-2T)

3. Heat exchanger PI control

Provides PI control for the motorized valve (Y1E) to maintain TeS and TcS at constant.

Motorized valve mode

EV mode		Initial opening	Max. opening	Min. opening	Normal opening
1	Y1E	2000	2000	2000	Fixed at 2000
	Y2E	2000	2000	2000	Fixed at 2000
2	Y1E	2000	2000	1400	Heat exchanger PI control
	Y2E	0	0	0	Fixed at 0
3	Y1E	750	1400	100	Heat exchanger PI control
	Y2E	250	400	100	Motorized valve PI control
4	Y1E	0	0	0	Fixed at 0
	Y2E	700	1000	100	Motorized valve PI control
5	Y1E	700	2000	100	Motorized valve PI control
	Y2E	500	2000	100	Motorized valve PI control

Heat exchanger mode

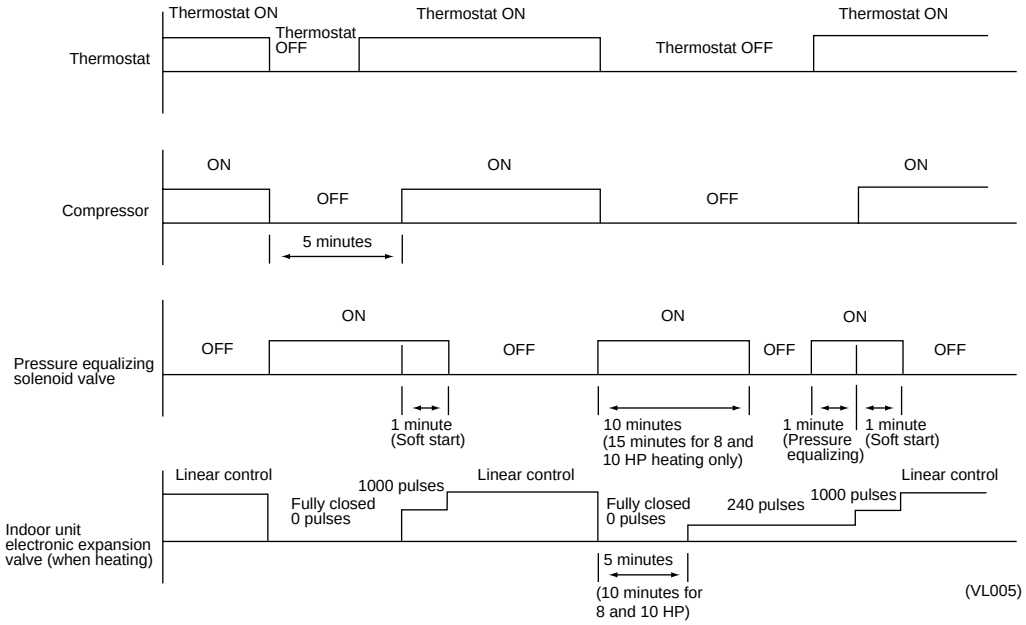
	Heat exchanger 1	Heat exchanger 2	FAN	EV mode
Cooling operation ↑	COND	COND	H + ON	1
	COND	COND	L + ON	1
	COND	COND	H + OFF	1
	COND	COND	L + OFF	1
	COND	EVAP	H + ON	2
	COND	EVAP	L + ON	2
	COND	EVAP	H + OFF	2
	COND	EVAP	L + OFF	2
	COND	EVAP	L + OFF	3
	COND	EVAP	L + OFF	4
	COND	EVAP	H + OFF	4
	COND	EVAP	H + ON	4
	EVAP	EVAP	L + OFF	4
	EVAP	EVAP	H + OFF	4
	EVAP	EVAP	H + ON	4
↓ Heat operation	EVAP	EVAP	H + ON	5

COND: Condenser
EVAP: Evaporator

1.5 Safety for Restart

1.5.1 Restart Safety Timer

The compressor will not run for five minutes by making forced thermostat OFF condition in order to prevent it from being turned on and off in rapid succession, and to equalize pressure in the refrigerant circuit. It however restarts automatically after five minutes passes if it is in thermostat ON condition. The pressure equalizing solenoid valve is actuated for 10 minutes (15 minutes for 8 and 10 HP heating only) after the compressor stops in order to equalize pressure.



If 10 minutes or more has elapsed since the compressor was turned off (15 minutes for 8 and 10 HP heating only), turn the solenoid valve for equalizing pressure on for about 1 minute and equalize the pressure.

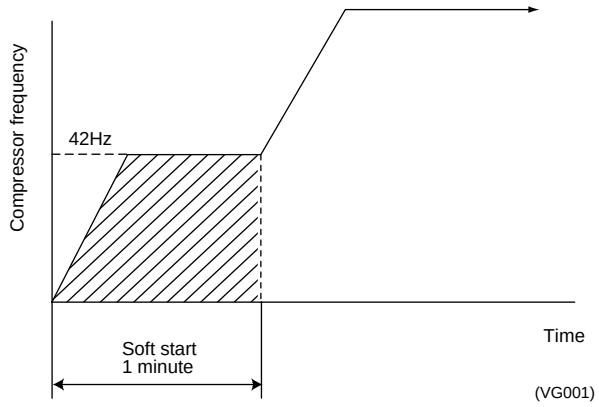
When heating, to prevent noise produced by the passing of indoor unit's refrigerant to equalize pressure after the compressor stops, fully close the indoor unit's electronic expansion valve for 5 minutes (10 minutes for 8 and 10 HP).

1.5.2 Soft Start

The following control is carried out to protect the compressor and inverter.

1. Operates at low frequency (fixed) for 1 minute after compressor starts. (Prevents liquid refrigerant backflow)
2. Hot gas bypass solenoid valves open and start low load.

Soft Start of Compressor



	Frequency during soft start
CU-5	42Hz
CU-8·10	42Hz+OFF

1.5.3 Pump Down Start (CU-8·10 only)

If the compressor stops running with refrigerant still remaining in the accumulator, in order to prevent wet operation at the next compressor starting, it will perform pump down start with a completely dry accumulator, then it will operate normally.

Pump down start should be performed if the unit is in any of the conditions given below when pressure equalizing control has been completed before start.
If R3-1T is less than 95°C and the unit is in any of the following conditions.

- ◆ Within 10 minutes of the compressor starting
- ◆ Defrosting or during oil return
- ◆ Within 20 minutes of completion of defrost or oil return
- ◆ Outdoor air temperature (R1T) < 0ºC
- ◆ Oil temperature (R5T) < Te + 10ºC
  Te : Low pressure equivalent saturated temperature

Operation During Pump Down Start

■ **MX1R Series**

11 min. 30 sec.

	1 min.	5 min.	30 sec.	30 sec.	4 min. 30 sec.
Compressor	42Hz+OFF	62Hz+OFF	32Hz+OFF		PI control ∗32~106 Hz + OFF
Outdoor unit EV	0 pulses	0 pulses	0 pulses		SH control (Initial opening 150 pulses)
Outdoor unit fan	H tap (H+ON)	H tap (H+ON)	H tap (H+ON)		H tap (H+ON)
Y2S	ON	ON	ON	OFF	ON/OFF (LP protection control)
Y3S, Y4S	ON	ON/OFF (Td protection control)	ON/OFF (Td protection control)		ON/OFF (Td protection control)

* When heating, low pressure < 1.5 kg/cm^2 (0.147MPa) → running frequency 54Hz (54Hz + OFF)
Low pressure > 1.7 kg/cm^2 (0.167MPa) [30 sec. continuous] → release

■ ME1R Series

11 min. 30 sec.

	1 min.	5 min.	30 sec.	30 sec.	4 min. 30 sec.
Compressor	42Hz+OFF	42Hz+OFF	30Hz+OFF		116Hz+OFF
Outdoor unit EV	0 pulses	0 pulses	0 pulses		150 pulses
Outdoor unit fan	H tap (H+ON)	H tap (H+ON)	H tap (H+ON)		H tap (H+ON)
Y2S	ON	ON	ON	OFF	ON/OFF (LP protection control)
Y3S	ON	ON/OFF (Td protection control)	ON/OFF (Td protection control)		ON/OFF (Td protection control)

- ◆ Y2S: Hot gas bypass solenoid valve
- ◆ Y3S: Injection solenoid valve

1.5.4 Heating Lay-Up Start

If the compressor hasn't run for a long time and the refrigerant isn't circulated, foaming could cause a lack of oil when the compressor is started at the next time. It should therefore perform heating lay-up start to keep the low pressure from dropping too low in the following cases.

- ◆ First starting after being power ON.
- ◆ Starting after the compressor has been stopped or thermostat OFF for more than continuous 24 hours.

Operation During Heating Lay-Up Start

Make the compressor's upper limit frequency 62Hz (62Hz+OFF) for 10 minutes 20 seconds after the compressor starts.

∗ If low pressure becomes < 1.5 kg/cm² (0.147MPa), operating frequency becomes 54Hz.
If low pressure becomes > 1.7 kg/cm² (0.167MPa), the heating lay-up operation is released.

1.6 Equalized Oil Level Operation
(Equalized Oil Level between Twin Compressors)

If using two compressors (8, 10Hp) connected in parallel, oil level equalizing is carried out for 5 minutes if the cumulative running time of the standard compressor exceeds 2 hours in order to prevent lack of oil cause by difference in pressure inside the dome due to drift, and then reverts to normal operation.

Inverter compressor	Standard compressor
106Hz	OFF

* If oil pressure equalization is not achieved during 5 minutes by stopping or step down control, oil pressure equalization is carried out when the standard compressor starts running.

With an inverter compressor operation, however, if the standard compressor remains off for 10 minutes, the cumulative running time of the standard compressor is reset.
During equalized oil level operation with Y2R → ON, when low pressure < 2.0kg/cm², Y2S becomes ON. (Reset at low pressure > 3.0kg/cm²)

1.7 Oil Return Operation

1.7.1 MX1R Series

In order to collect refrigeration oil held up in connecting piping, the compressor's operating time is counted, and oil return operation is carried out for 4 minutes every 8 hours (2 hour after turning on the power supply, and every 8 hours after that).
(When heating, the indoor unit's electric heater is tuned off one minute prior to oil return operation in preparation for oil return.)

(1) Compressor Operation Frequency

Type	Cool	Heat
CU-5(5HP)	106Hz	96Hz
CU-8(8HP)	106Hz+ON	86Hz+ON
CU-10 (10HP)	106Hz+ON	86Hz+ON

*When heating, frequency is lower than that given in the table for the first 30 seconds and 30 seconds after completion.
*Frequency may drop according to the various types of step-down control. If so, the next oil return must be carried out 4 hours later.

(2) Opening of the electronic expansion valve

	Outdoor unit	Operating indoor unit	Indoor unit turned off
When cooling	2000 pulses (fully open)	2000 pulses (fully open)	1440 pulses
When heating	2000 pulses (fully open)	2000 pulses (fully open)	2000 pulses (fully open)

(3) 4-way changeover valve (Y1R)
When cooling: No change
When heating: Switches to cooling mode

(4) Fan and solenoid valve
Step No. changes according to high pressure.

Step No.	Y2S	Y3S,Y4S	Fan
①	ON*	ON	H(H+ON)
②	OFF*	ON	L(H+OFF)
③	OFF*	ON	OFF

(Step No. becomes higher as high pressure decreases.)
①→②30 sec. after oil return start or high pressure is less than 16kg/cm^2 (1.57MPa)
②→③High pressure is less than 8 kg/cm^2 (0.78MPa)
③→②High pressure is greater than 16.4 kg/cm^2 (1.61MPa)
②→①High pressure is greater than 22 kg/cm^2 (2.16MPa)

*When heating only
*On when low pressure <0.3 kg/cm^2 (0.029MPa)
Off when low pressure <0.8 kg/cm^2 (0.078MPa)
Notes)

1. While the oil return timer is counting, if the compressor frequency continues at 68Hz (38Hz + ON for 8, 10HP) or more for more than eight minutes with defrosting, the timer is reset and counts again for eight hours.
2. If on standby (forced thermostat OFF) or the compressor stops due to malfunction during oil return operation, the next time the compressor starts, oil return operation is again carried out for four minutes after completion of soft start.
3. Oil return operation is not carried out for 28 minutes after defrost is completed.

1.7.2 ME1R Series

In order to collect refrigeration oil held up in connecting piping, the compressor's operating time is counted, and oil return operation is carried out for 8 minutes 30 seconds every 8 hours (2 hour after turning on the power supply, and every 8 hours after that).
(When heating, the indoor unit's electric heater is tuned off one minute prior to oil return operation in preparation for oil return.)

Operation Contents

Preparation for Oil Return

1 Minute Elapses

Upper Limit Frequency Limited to 38Hz + ON

(VF014)

Step 1 → Discharge oil return k = kg/cm²

Compressor	86Hz + OFF
EEV	2000pls
Outdoor Unit Fan	H + ON
Outdoor Unit Heat Exchanger	Condenser
4 Way Valve	OFF
Injection 1	Td Protection Control
Injection 2	OFF
Hot Gas	ON at Lp < 0.3k

4 Minutes Elapsed

Step 2 → Suction oil return

Compressor	86Hz + OFF
EEV	2000pls
Outdoor Unit Fan	H + ON
Outdoor Unit Heat Exchanger	Condenser
4 Way Valve	OFF
Injection 1	Td Protection Control
Injection 2	Td Protection Control
Hot Gas	ON at Lp < 0.3k

4 Minutes Elapsed
∗ Td : Discharge Pipe Temperature

Step 3 → HR solenoid valve changeover

Compressor	38Hz + OFF
EEV	2000pls
Outdoor Unit Fan	H + ON
Outdoor Unit Heat Exchanger	Condenser
4 Way Valve	OFF
Injection 1	Td Protection Control
Injection 2	OFF
Hot Gas	ON at Lp < 0.3k

30 Seconds Elapsed

Step 4 → Refrigerant is discharged from accumulator

Compressor	76Hz + OFF
EEV	Limit of Opening
Outdoor Unit Fan	H + ON
Outdoor Unit Heat Exchanger	Evaporater
4 Way Valve	ON
Injection 1	Td Protection Control
Injection 2	OFF
Hot Gas	Low Pressure Protection Control

5 Minutes Elapsed
Hp > 15.2k
R5T > Te + 10ºC
* Te : Low Pressure Equivalent Saturated Temperature

Normal Control

1.8 Defrost

1.8.1 MX1R Series

■ **Function**

Defrost operation is carried out if the relation of the outdoor unit's coil temperature (Tcoil) and outdoor temperature (Tair) satisfies the conditions given below for 5 minutes continuously.

Tcoil≤C · Tair-¿

- Tcoil : Temperature detected by R2T
- Tair : Temperature detected by R1T
- C : Tair<0˚C→0.8
  Tair≥0˚C→0.6

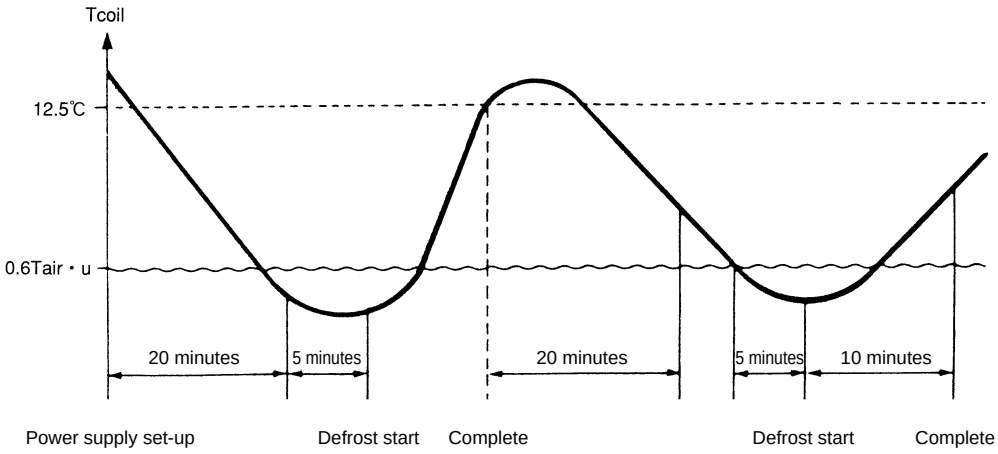
(M104)

The values of (a) according to defrost temperature changeover switch are given in the table below.

Switch position LED (23 24 25 26)	L (● ● ● ○)	M (● ● ○ ●)	H (● ○ ● ●)
(deg)	16	14	12

Therefore, if outdoor temperature is 0°C:
(1) If position L, Tcoil ≤ –16°C
(2) If position M, Tcoil ≤ –14°C
(3) If position H, Tcoil ≤ –12°C
Because defrost operation is carried out, set to the "H" position if frost builds up easily, and set to "L" if not. Factory set is position "M."

Defrost is carried out when the coil temperature rises to 9.5°C or higher or Pc > 22 kg/cm², and is completed after defrosting for 10 minutes.
After defrosting, indoor units carry out hot start operation and the DEFROSTING display lights until hot start is complete.
Defrost conditions are not counted from completion of power supply set-up and defrost until the compressor runs (count) for 20 minutes.



1.8.2 ME1R Series

Melts frost which might collect on outdoor heat exchangers during heating in order to recover their heat transfer performance.

Conditions for executing defrost

OR	**&**	At least 20 minutes have elapsed since completion of oil return or since compressor starts.
		High pressure < 22k (Tc = 54.7ºC)
		Compressor is running at least 30 minutes since completion of previous defrost.
		Either liquid pipe thermal detection temperature (R2-1T, R2-2T) < TºC for 5 minutes.
	&	Forced defrost test pin (MDS) is shorted.
		Liquid pipe thermal detection temperature (R2-1T, R2-2T) < 12.5ºC for all units
		High pressure < 22k (Tc = 54.7ºC)

∗ Tc : High pressure equivalent saturated temperature

T = C × (Outdoor temp.) – α
(C is constant)
C : Tair ≤ 0°C → 0.8
Tair > 0°C → 0.6
∗ Tair = Outdoor air temperature

The values of (α) according to defrost temperature changeover switch are given in the table below.

Switch position LED (H4P, H5P, H6P, H7P)	L (● ● ● ○)	M (● ● ○ ●)	H (● ○ ● ●)
(deg)	16	14	12

Therefore, if outdoor temperature is 0°C:
(1) If position L, Tcoil (R2-1T, R2-2T) ≤ -16°C
(2) If position M, Tcoil (R2-1T, R2-2T) ≤ -14°C
(3) If position H, Tcoil (R2-1T, R2-2T) ≤ -12°C
Because defrost operation is carried out, set to the “H” position if frost builds up easily, and set to “L” if not. Factory set is position “M.”

Operation Contents

Preparation for Defrost

1 Minute Elapses

Upper Limit Frequency Limited to 38Hz + ON

(VF015)

Step 1 → Discharge defrost k = kg/cm²

Compressor	86Hz + OFF
EEV	2000pls
Outdoor Unit Fan	OFF + OFF
Outdoor Unit Heat Exchanger	Condenser
4 Way Valve	OFF
Injection 1	Td Protection Control
Injection 2	OFF
Hot Gas	ON

↓ 3 Minutes Elapsed

Step 2 → Suction defrost

Compressor	86Hz + ON
EEV	2000pls
Outdoor Unit Fan	OFF + OFF
Outdoor Unit Heat Exchanger	Condenser
4 Way Valve	OFF
Injection 1	Td Protection Control
Injection 2	Td Protection Control
Hot Gas	ON

↓ Conclution of Defrost Completion Condition

or
- All of R2-1T, R2-2T ≥ 9.5ºC
- Pc > 22k
- 10 Minutes Elapsed Since Defrost Operation Start

Step 3 → HR solenoid valve changeover

Compressor	38Hz + OFF
EEV	2000pls
Outdoor Unit Fan	OFF + OFF
Outdoor Unit Heat Exchanger	Condenser
4 Way Valve	OFF
Injection 1	Td Protection Control
Injection 2	OFF
Hot Gas	ON

↓ 40 Seconds Elapsed

Step 4 → Refrigerant is discharged from accumulator

Compressor	76Hz + OFF
EEV	Limit of EV Opening
Outdoor Unit Fan	H + ON
Outdoor Unit Heat Exchanger	Evaporator
4 Way Valve	ON
Injection 1	Td Protection Control
Injection 2	OFF
Hot Gas	Low Pressure Protection Control

↓

or
- 5 Minutes Elapsed
- Pc > 15.2k
- R5T > Te + 10ºC

Normal Control

∗Pc = Condensing Pressure

1.9 Pressure Equalization Control (ME1R Series)

The discharge gas and suction gas pipes are bypassed to eliminate differential pressure between the inlet and outlet of the solenoid valve during HR boxes solenoid switching operations.

■ Equalizing operation demand → Pressure equalization solenoid valve (Y1S) is ON at following conditions.

&	Operating condition of indoor unit with thermostat ON is different from the condition of HR boxes' solenoid valve (see page 253).
	Not in startup control.
	Liquid refrigerant not being discharged from accumulator.
	Not in residual pump-down operation.
	7 minutes passed after completion of previous pressure equalizing control operation.
	Not in oil return control
	Not in defrost operation

1.10 Frequency Limit Control by Pressure Equalization (ME1R Series)

The compressor operating capacity is limited to prevent abnormal noise caused by the equalizing operation.
Operating conditions

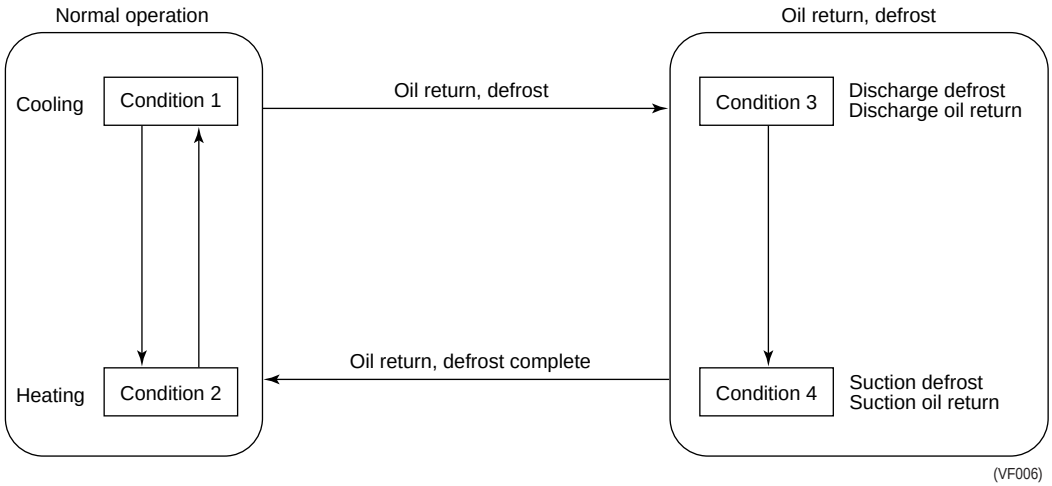
&	Equalizing operation demand issued
	Not in cooling operation only

During the first 30 seconds, the following operations are conducted.

	INV outdoor unit
Compressor operating capacity	54Hz + OFF

1.11 HR Changeover Control (ME1R Series)

The solenoid valve of the HR box is switched according to the indoor unit operating condition.



Condition	Indoor unit operating condition	Y3S	Y2S	Y1S
1	Cooling Heating stop ∗1	OFF	ON	OFF
2	Heating thermostat OFF Heating thermostat ON	ON	OFF	∗2
3	Discharge oil return	OFF	OFF	OFF
4	Suction oil return Defrost	ON	ON	OFF

ON: Open
OFF: Closed

When the solenoid is operable, if the operating condition differs from the solenoid condition, the solenoid is switched according to the above table.
However, the following conditions take precedence.

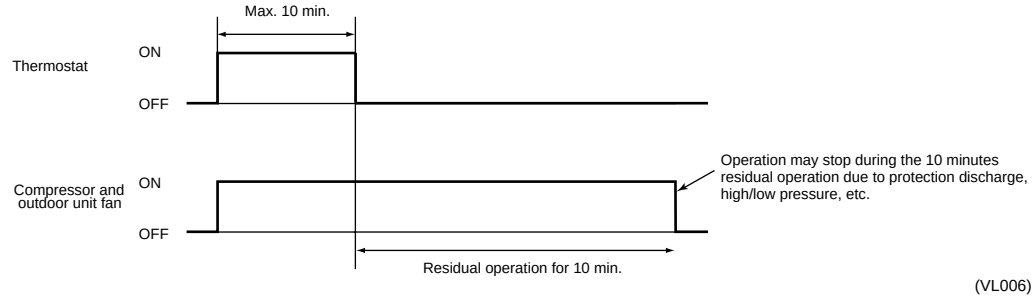
∗1: Condition 2 results in heating stop units when no unit in the system is in cooling operation.
∗2: Condition 1 results when a unit connected to the HR box is in heating thermostat ON condition during simultaneous cooling/heating operations.

1.12 Pump Down Residual Operation

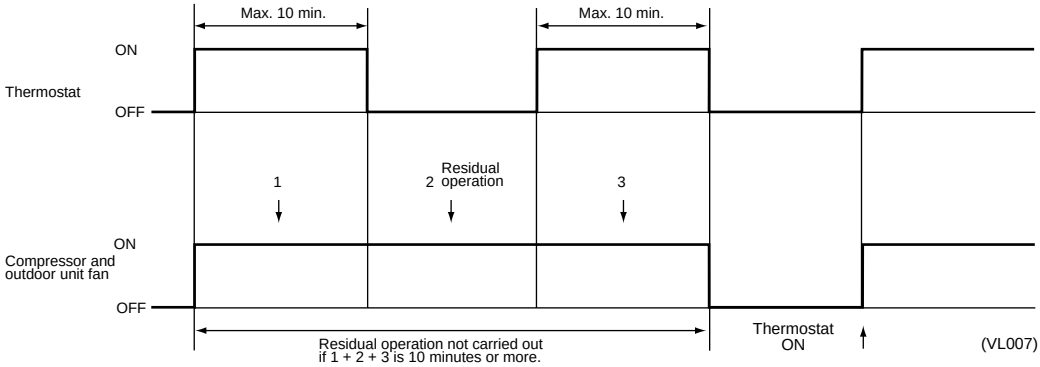
If refrigerant is remaining in the accumulator when the compressor starts, liquid refrigerant is sucked into the compressor, diluting the refrigerant machine oil and reducing the lubricating performance. To prevent this, the pump-down operation discharges refrigerant from the low pressure side when the unit is not in operation.

Residual operation may be carried out for Max.10 minutes under the following conditions.
1.

&	Secondary side heat exchanger 4 way valve (Y2R) is ON.	
	Discharge pipe thermistor (R3-1T) on inverter side: 95°C or lower	
	OR	Outside air temperature thermistor (R1T) < 0°C
		When compressor continuous operating time is less than 10 minutes and thermostat is OFF, or when stop command is received from remote controller
		Within 20 minutes after defrost or oil return operation
		R5T (oil temperature) ≤ Te+15



2. When the thermostat is ON during residual operation, residual operation is not carried out if the total of 1+2+3 is 10 minutes or more.



* When outdoor temperature (R1T) is less than -5°C and a stop command is reseived from the thermostat sensor, etc., residual operation is carried out for 10 minutes without fail. (Operation may however stop for discharge pipe or high/low pressure safety.)

Outdoor Unit Function

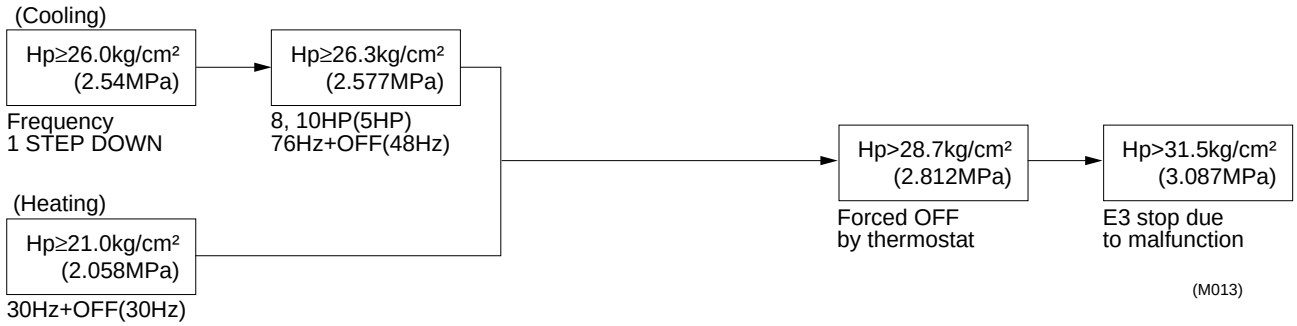
Outdoor air (R1T)	Compressor		Electronic expansion valve	Pressure equalizing Solenoid valve	Time
	INV	STD			
R1T < -10°C	86Hz	OFF	0~300 pulses	ON or OFF	10 min.
-10°C ≤ R1T < 0°C	76Hz	OFF	0~300 pulses	ON or OFF	10 min.
R1T ≥ 0°C	62Hz	OFF	0~300 pulses	ON or OFF	10 min.

Notes:
- During defrost or oil return, residual operation is not carried out even if a stop command comes.
- Forced thermostat OFF occurs if defrost or oil return signal comes during residual operation.

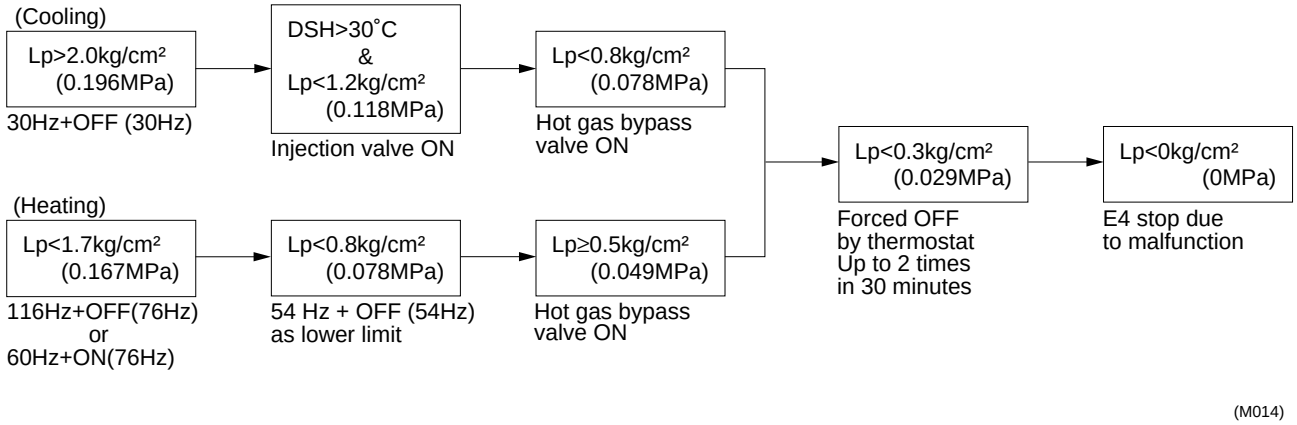
1.13 Step Down / Safety Control → Standby (Forced Thermostat OFF) → Stop Due to Malfunction

1.13.1 MX1R Series

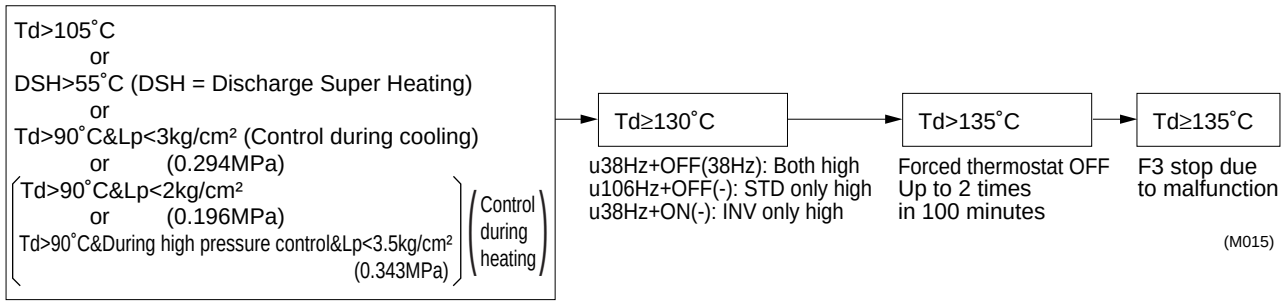
High Pressure (Hp) Control



Low Pressure (Lp) Control



Discharge Pipe Temperature (Td) Control



Inverter Current Control

Discharge Super Heating (DSH) Control

(DSH = Td - high pressure condensation saturation temperature)
During both the inverter and standard compressors are running, when the injection valve for either one goes OFF and discharge super heating (DSH) continues for 10 minutes at temperature difference of less than 10°C, the inverter+standard compressor are controlled at 76 Hz or less+OFF for 3 minutes.

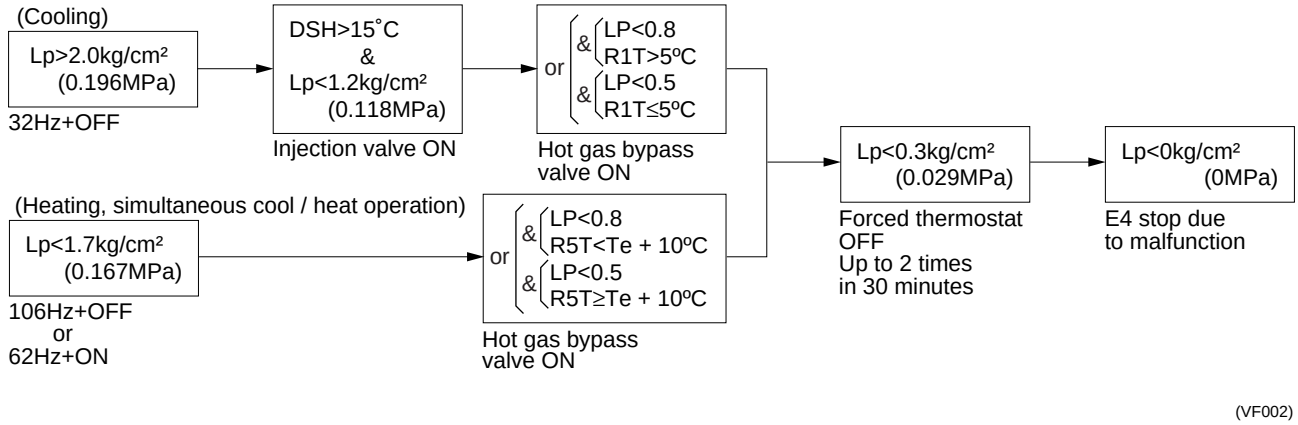
Control According to Outdoor Temperature

If the outdoor temperature exceeds 27°C when heating, forced thermostat OFF is carried out in order to prevent a safety device from being tripped or a sensor malfunction.

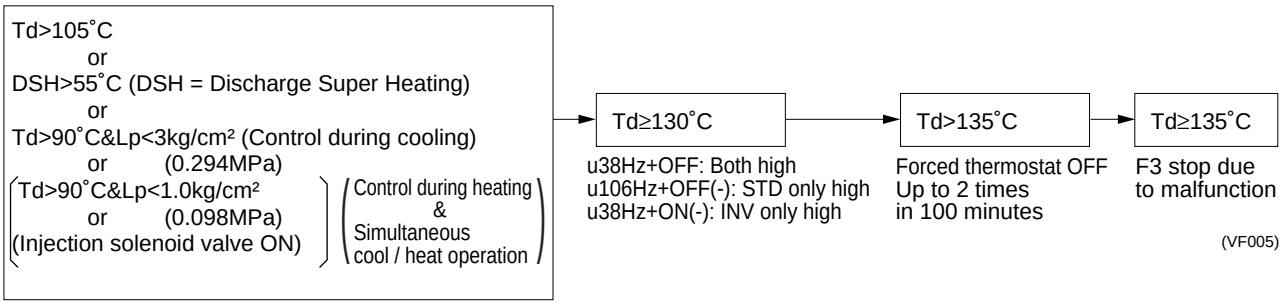
1.13.2 ME1R Series

High Pressure (Hp) Control

Low Pressure (Lp) Control



Discharge Pipe Temperature (Td) Control



Inverter Current Control

Discharge Super Heating (DSH) Control

(DSH = Td - high pressure condensation saturation temperature)
During both the inverter and standard compressors are running, when the injection valve for either one goes OFF and discharge super heating (DSH) continues for 10 minutes at temperature difference of less than 10°C, the inverter+standard compressor are controlled at 76 Hz or less+OFF for 3 minutes.

Control According to Outdoor Temperature

If the outdoor temperature exceeds 23°C when heating, forced thermostat OFF is carried out in order to prevent a safety device from being tripped or a sensor malfunction.

1.14 Control During Low Outdoor Air Temperature Cooling

When the outdoor air temperature is low in cooling operation, outdoor unit fans, electronic expansion valve and compressors are controlled as follows in order to primarily maintain high pressure and to protect drop in refrigerant circulation caused by drop in high pressure.

CU-5

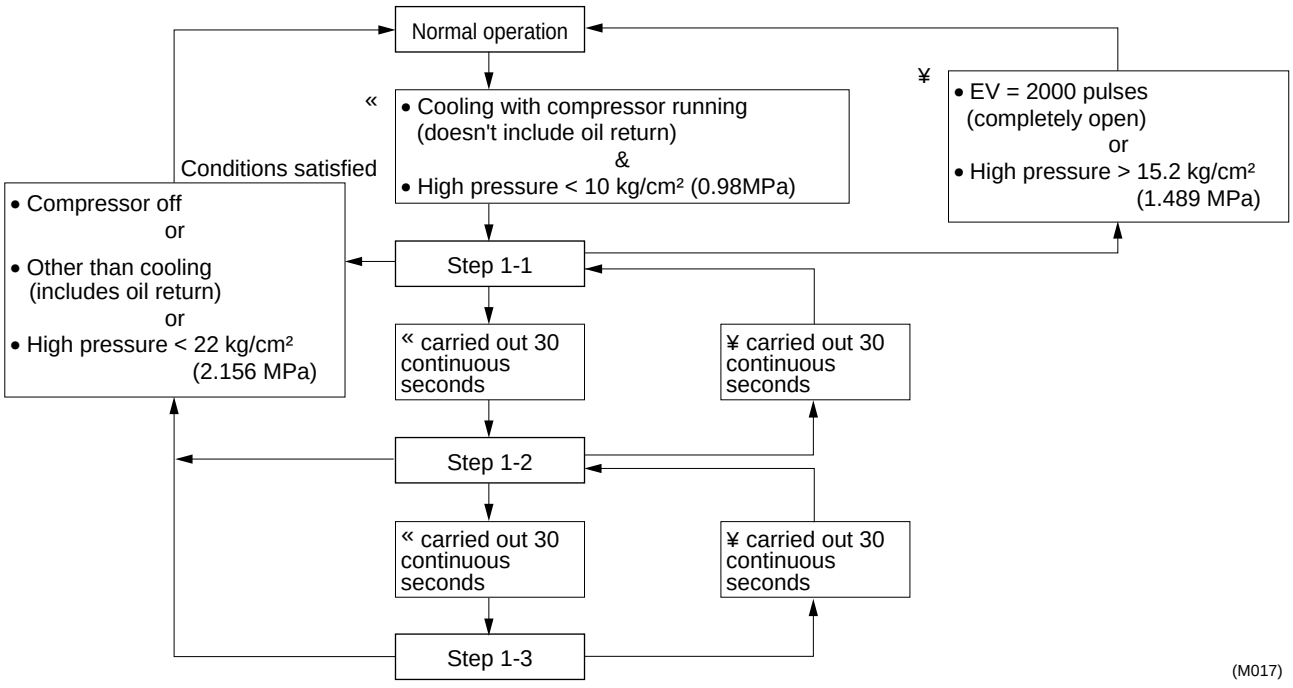
Operating status		Electronic expansion valve	Fan	Frequency (Hz)
Normal operation		Fully open	H	Changes according to operating status
Low outdoor temperature cooling operation	Step 1	Fully open	L	76
	Step 2	Fully open	OFF	48

CU-8·10

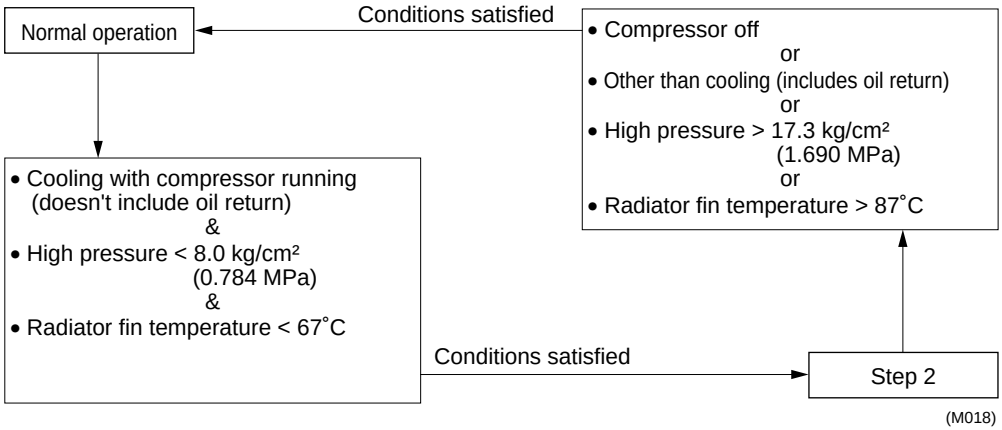
Operating status		Electronic expansion valve	Fan		Frequency (Hz)	
			M1F	M2F	8K	10K
Normal operation		Fully open	H	ON	Changes according to operating status	
Low outdoor temperature cooling operation	Step 1-1	Fully open	L	ON	96	116
	Step 1-2	Fully open	H	OFF	86	106
	Step 1-3	Fully open	L	OFF	76	96
	Step 2	Fully open	OFF	OFF	62	76

Note: Step No. changes according to high pressure, low pressure and frequency.
(Step No. increases with reduction of high and low pressure.)

Low Outdoor Air Cooling in Conditions (Steps 1-1, 2, 3)



Low Outdoor Air Cooling in Conditions (Step 2)



1.15 Low Noise Control

If sound produced by outdoor units is a problem at night, etc., you can reduce the running noise by 2 to 3 dB by running the outdoor unit fans and compressors at low speed via contact input (low noise input) from outside. When low noise input is received (contact short circuit) while the compressor is running (except when defrosting or oil return is being carried out), the operation upper limit is as follows.

		CU-5	CU-8	CU-10
		(5HP)	(8HP)	(10HP)
Outdoor unit fan	step 1	L tap	H tap+OFF	
	step 2	L tap	L tap+ON	
compressor		62Hz	86Hz+OFF	96Hz+OFF

◆ When cooling: Step1 → 2 high pressure > 26.6 kg/cm² (2.61 MPa)
Step2 → 1 high pressure < 20.8 kg/cm² (2.04 MPa)

- Low noise control reduces capacity by limiting the fan speed and compressor frequency. The load when heating is particularly large at night when the outdoor temperature is low, and could result in insufficient capacity.
- During low noise control, retry is unlimited for standby (forced thermostat OFF) produced by high pressure, low pressure or discharge pipe temperature.
- An optional BMS interface adaptor for outdoor units is required for low noise control. For method of connection, see low noise operation in the test operation section.

1.16 Demand Control

When you like to save the power consumption, there are three modes of demand operation which controls forced capacity save for outdoor units via contact input (demand input) from outside in order to control demand.

Demand 1: Holds electric power consumption down to approx. 70%
Demand 2: Holds electric power consumption down to approx. 40%
Demand 3: Forced thermostat OFF

- An optional BMS interface adaptor for outdoor units is required for demand control. For method of connection, see demand operation in the test operation section.
- Control is carried out by limiting the upper limit for frequency of demand 1 and demand 2 as given in the table below.

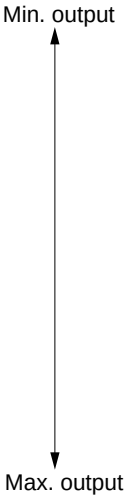
	5HP	8HP	10HP
Demand 1	62Hz	48Hz+ON	62Hz+ON
Demand 2	34Hz	62Hz+OFF	76Hz+OFF
Demand 3	Forced thermostat OFF		

1.17 Compressor Capacity Control

CU-5

Pressure is sampled every 20 seconds by pressure sensor, and the inverter compressor is controlled in 13 stages by microcomputer.
Frequency range: 34 - 116 Hz (13 stages) and common for 50/60Hz area.

Frequency
32Hz
34Hz
38Hz
42Hz
48Hz
54Hz
60Hz
68Hz
76Hz
86Hz
96Hz
106Hz
116Hz



(M019)

CU-8·10

Pressure is sampled every 20 seconds by pressure sensors, and the inverter + standard compressor is controlled in 20 stages by microcomputer.

Commercial power supply compressor (off)	Commercial power supply compressor (full load)
Frequency	Frequency
32Hz+OFF	
34Hz+OFF	
38Hz+OFF	
42Hz+OFF	
48Hz+OFF	
54Hz+OFF	
62Hz+OFF	
68Hz+OFF	
76Hz+OFF	
86Hz+OFF	
96Hz+OFF	
106Hz+OFF	
	38Hz+ON
	48Hz+ON
	62Hz+ON
	76Hz+ON
	86Hz+ON
	96Hz+ON
	106Hz+ON
	116Hz+ON

(VE005)

1.18 Te / Tc Setting

You can alter the value of targets Te (evaporating pressure equivalent temperature) and Tc (condensing pressure equivalent temperature) with setting mode 2. PI control is used to control compressor capacity so that Te when cooling and Tc when heating are constant.

Te setting	Set temperature
High	10.5 °C
Standard	7.5 °C
Low	4.5 °C

◆ Target Te changes according to compressor operating frequency, length of piping and indoor load. The range is -10°C ≤ target Te ≤ 5.5°C. (Piping length is determined automatically during oil return operation.)

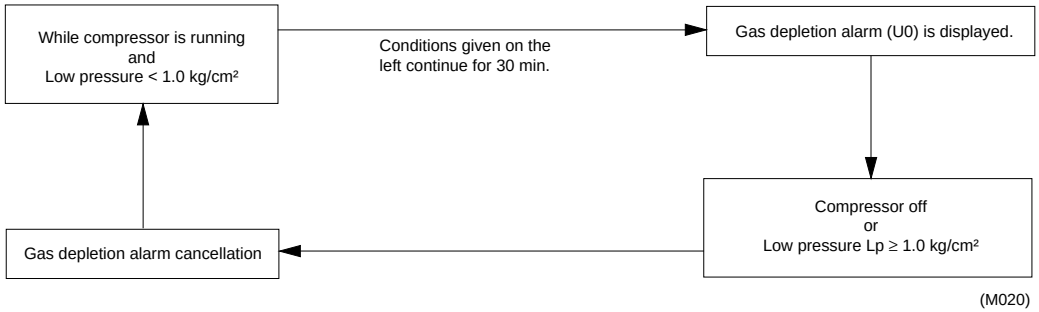
Tc setting	Set temperature
High	51 °C
Standard	48 °C
Low	45 °C

∗ Target Tc becomes 3°C higher when indoor load is large.
Target Tc is controlled in accordance with the following conditions:
*Outdoor temp. > 10°C → target Tc ≤ 48°C
*Outdoor temp. ≤ 10°C → target Tc ≤ 51°C
*Target Tc is 43°C when high pressure > 18.6 kg/cm^2 (1.822 MPa) and low pressure < 1.8 kg/cm^2 (0.176 MPa).

1.19 Gas Depletion Alarm

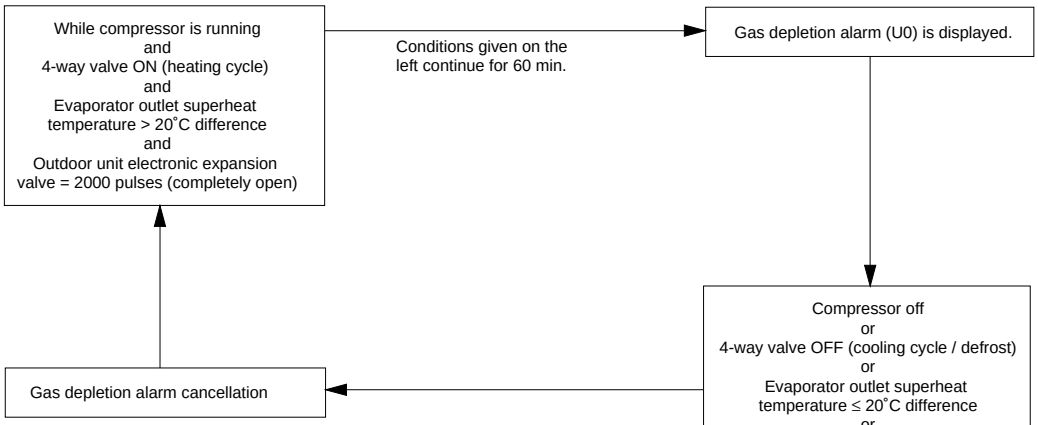
An alarm (U0) is given for severe gas depletion. Alarm is indicated but operation continues.

When Cooling



(M020)

When Heating

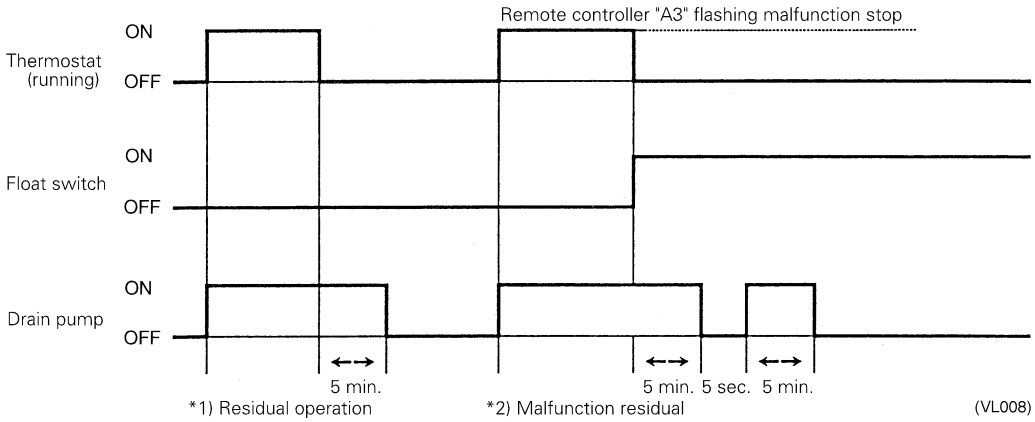


(M021)

1.20 Drain Pump Control

1. The drain pump is controlled by the ON/OFF buttons (4 button (1) - (4) given in the figure below).

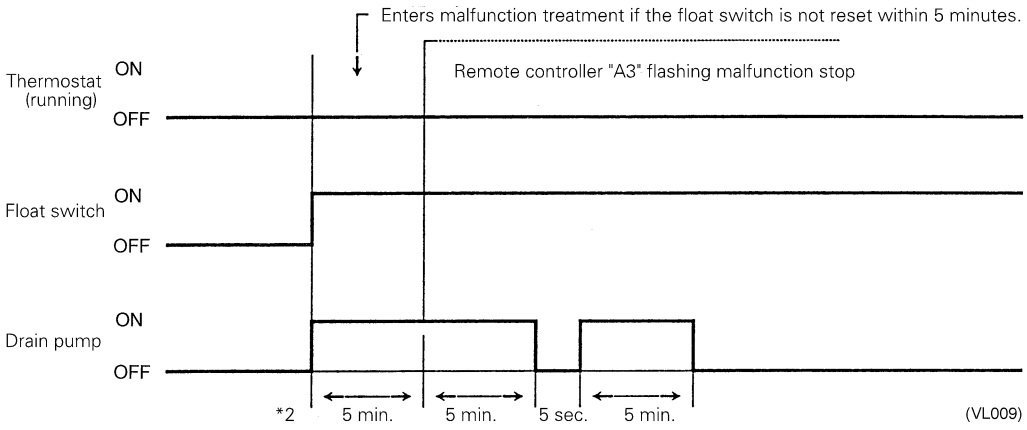
1.20.1 When the Float Switch is Tripped While the Cooling Thermostat is ON:



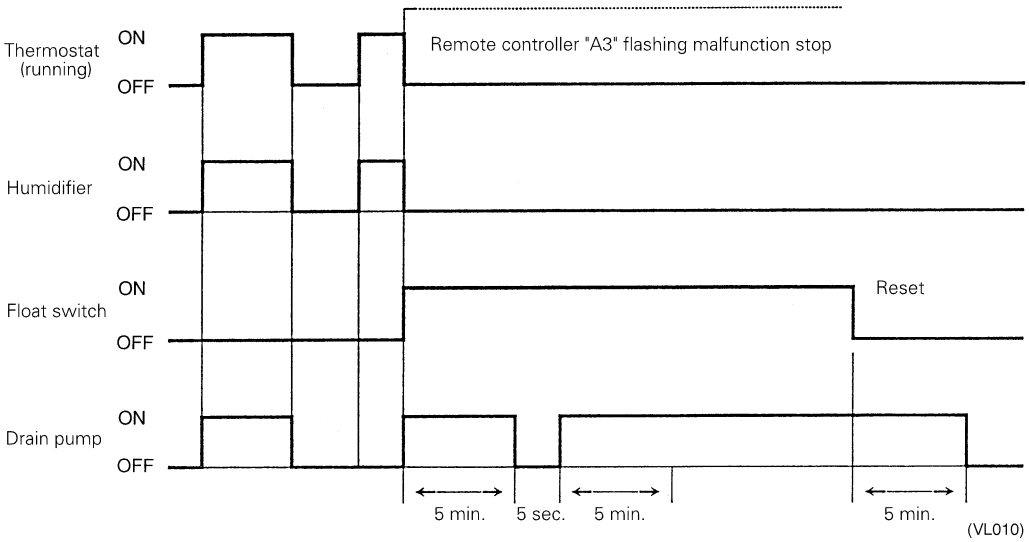
∗ 1.The objective of residual operation is to completely drain any moisture adhering to the fin of the indoor unit heat exchanger when the thermostat goes off during cooling operation.

∗ 2.One cycle consists of 5 minutes of operation, 5 seconds stop, and another 5 minutes of operation.

1.20.2 When the Float Switch is Tripped During Cooling OFF by Thermostat:

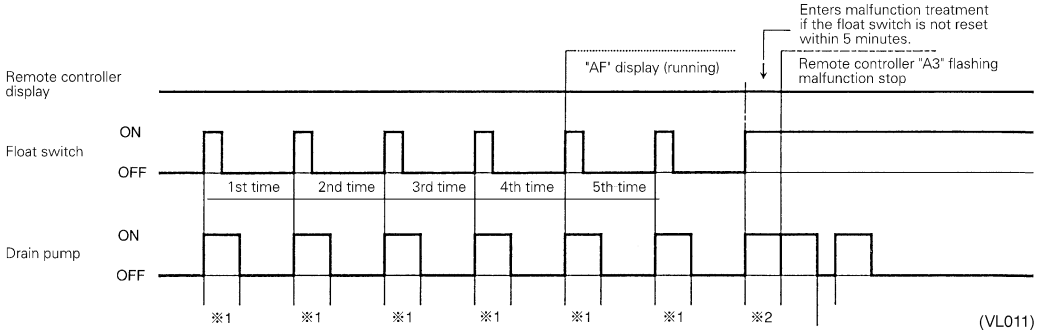


1.20.3 When the Float Switch is Tripped During Heating Operation:



During heating operation, if the float switch is not reset even after the 5 minutes operation, 5 seconds stop, 5 minutes operation cycle ends, operation continues until the switch is reset.

1.20.4 When the Float Switch is Tripped and “AF” is Displayed on the Remote Controller:

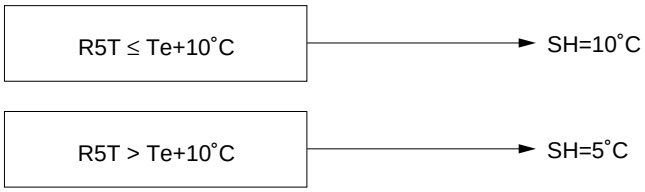


Note: If the float switch is tripped five times in succession, a drain malfunction is determined to have occurred. “AF” is then displayed as operation continues.

1.21 Oil Temperature Sensor (8 and 10 Hp only)

1.21.1 Prevention of Wetness during Heating

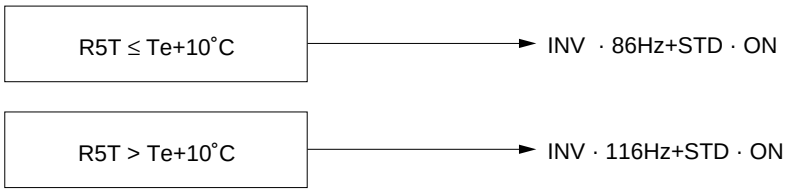
◆ Wet operation is prevented by modification of super heating (SH) by oil temperature sensor (R5T). (Low equivalent pressure = Te)



(M022)

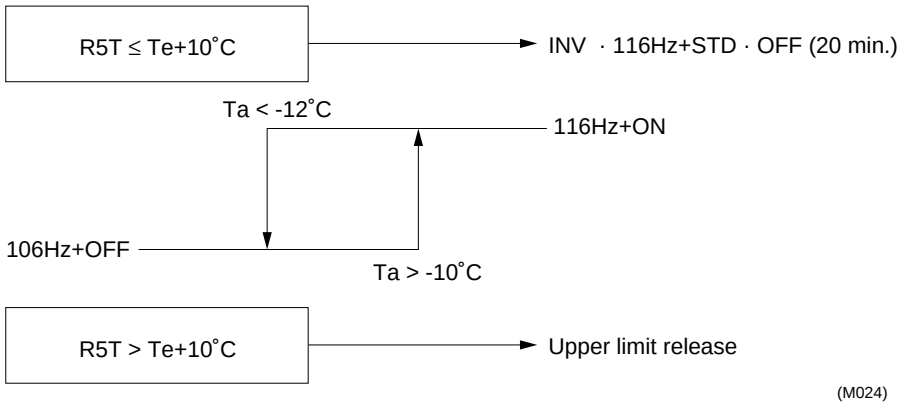
1.21.2 Prevention of Oil Dilution during Defrost

◆ The unit controls upper limit frequency of the compressor and is designed to prevent oil from being diluted while defrosting by means of an oil temperature sensor.



(M023)

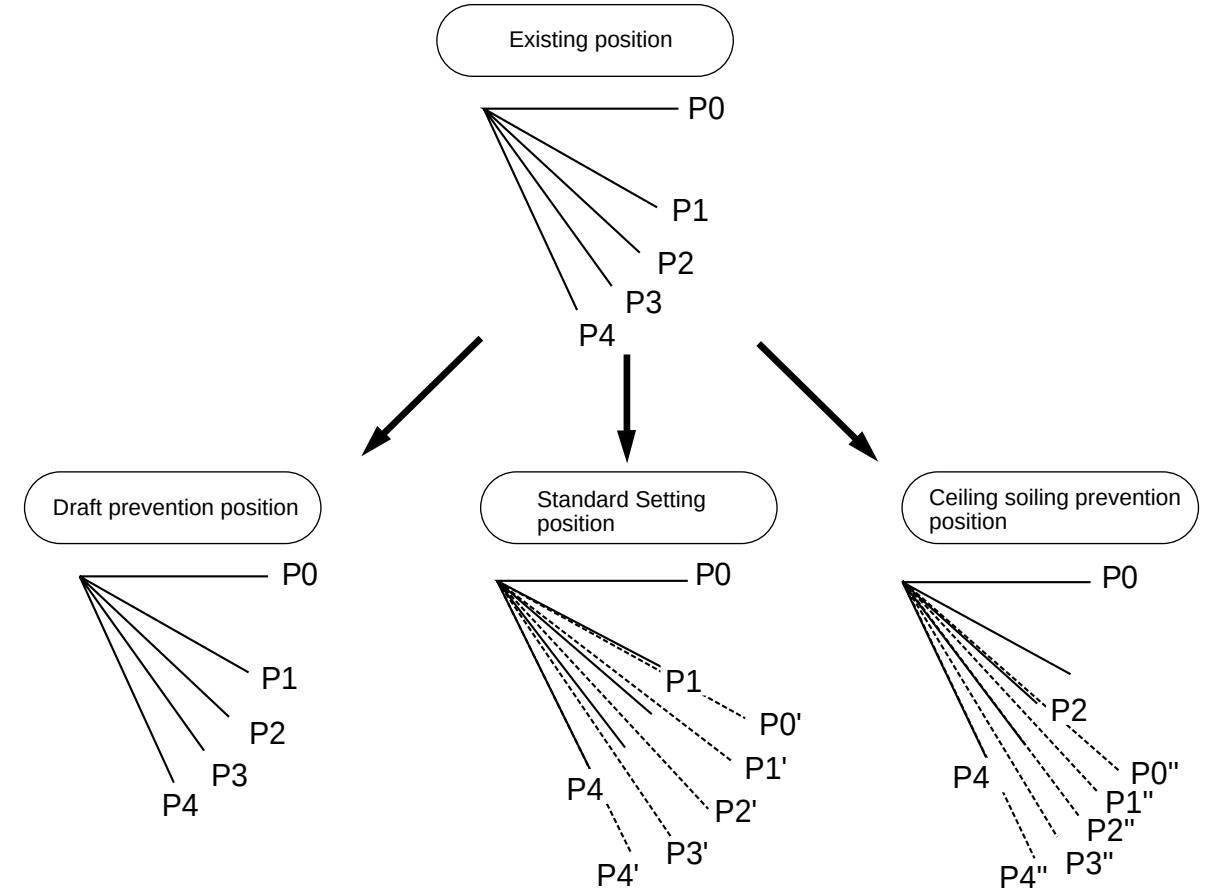
◆ Startup subsequent to defrosting is improved by the oil temperature sensor.



(M024)

1.22 Louver Control for Preventing Ceiling Dirt

We have added a control feature that allows you to select the range of in which air direction can be adjusted in order to prevent the ceiling surrounding the air discharge outlet of ceiling mounted cassette type units from being soiled. (This feature is available on 2-way blow, 4-way blow and corner types.)



Draft prevention position	P0	P1	P2	P3	P4	Same as existing position
		Range of direction adjustment				
Standard position	Prohibited	P0'	P1'	P2'	P3'	P4'	Separated into 5 positions (P1 - 4)
		Range of direction adjustment				
Dirt prevention position	Prohibited	P0"	P1"	P2"	P3"	P4"	Separated into 5 positions (P2 - 4)

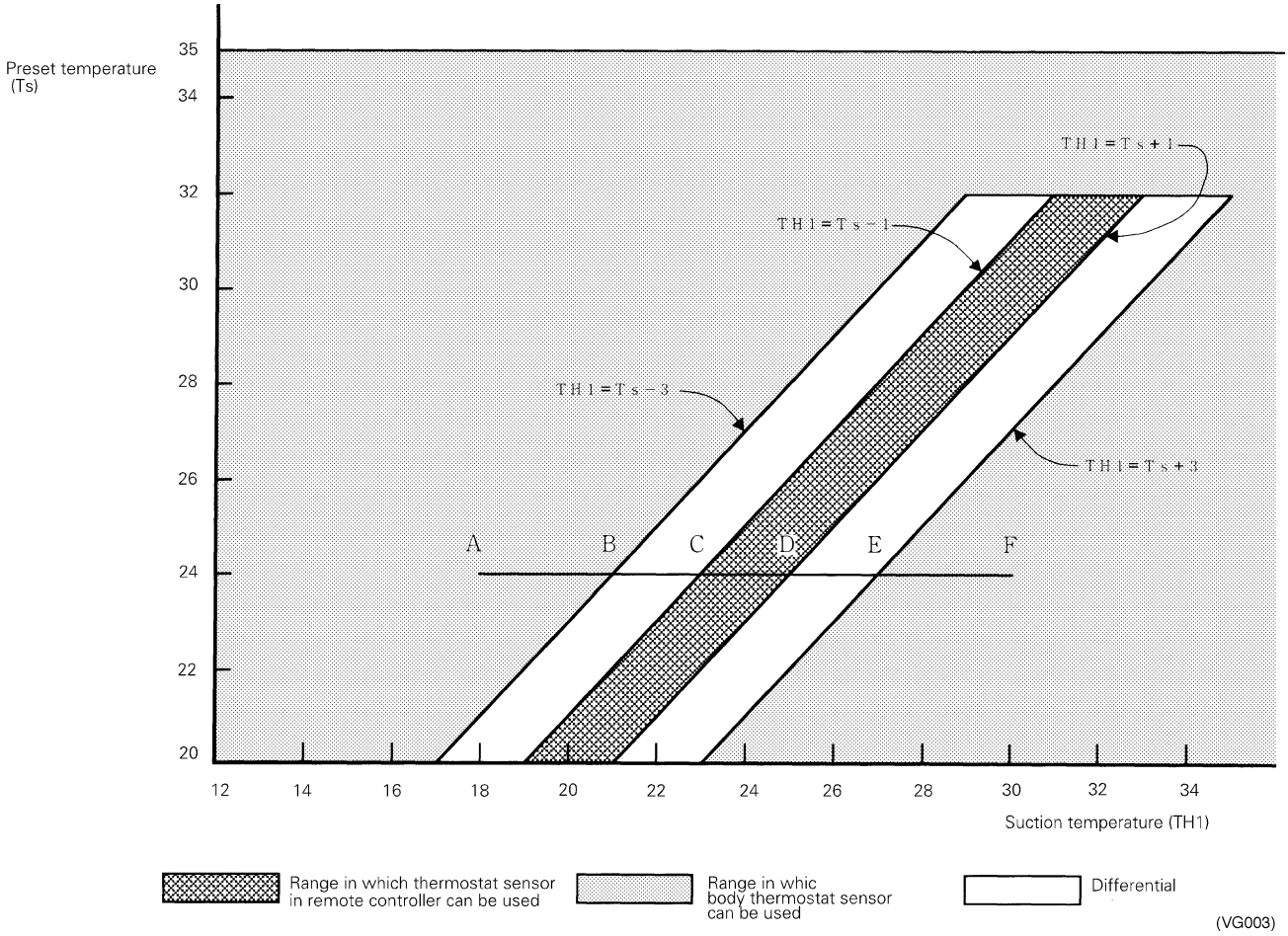
The factory set position is standard position. (VL012)

1.23 Thermostat Sensor in Remote Controller

Temperature is controlled by both the thermostat sensor in remote controller and air suction thermostat in the indoor unit. (This is however limited to when the field setting for the thermostat sensor in remote controller is set to “Use”.)

Cooling

If there is a significant difference in the preset temperature and the suction temperature, fine adjustment control is carried out using a body thermostat sensor, or using the sensor in the remote controller near the position of the user when the suction temperature is near the preset temperature.



■ **Ex: When cooling**

Assuming the preset temperature in the figure above is 24°C, and the suction temperature has changed from 18°C to 30°C (A → F):

(This example also assumes there are several other air conditioners, the UM Series is off, and that temperature changes even when the thermostat sensor is off.)

Body thermostat sensor is used for temperatures from 18°C to 23°C (A → C).

Remote controller thermostat sensor is used for temperatures from 23°C to 27°C (C → E).

Body thermostat sensor is used for temperatures from 27°C to 30°C (E → F).

And, assuming suction temperature has changed from 30°C to 18°C (F → A):

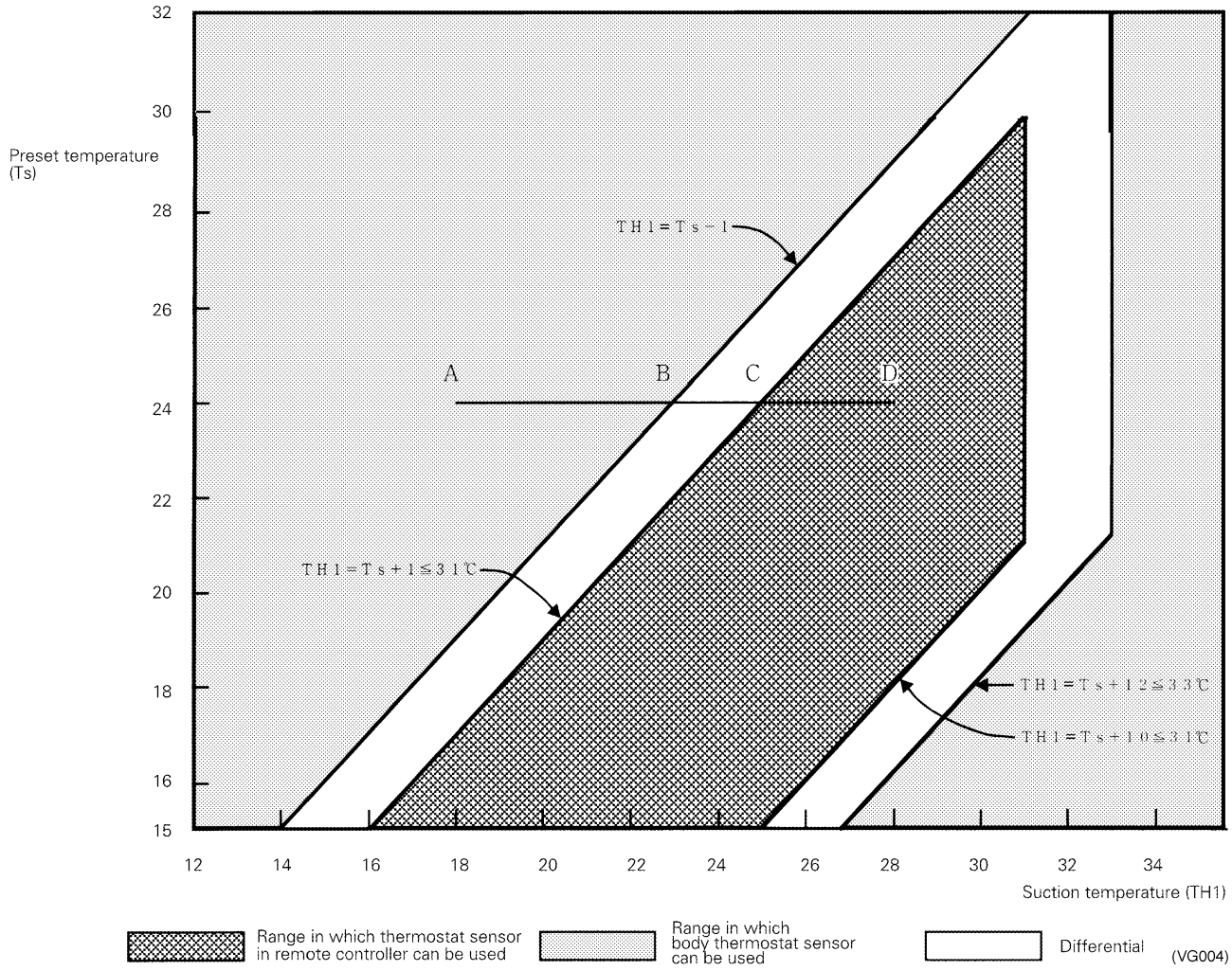
Body thermostat sensor is used for temperatures from 30°C to 25°C (F → D).

Remote controller thermostat sensor is used for temperatures from 25°C to 21°C (D → B).

Body thermostat sensor is used for temperatures from 21°C to 18°C (B → A).

Heating

When heating, the hot air rises to the top of the room, resulting in the temperature being lower near the floor where the occupants are. When controlling by body thermostat sensor only, the unit may therefore be turned off by the thermostat before the lower part of the room reaches the preset temperature. The temperature can be controlled so the lower part of the room where the occupants are doesn't become cold by widening the range in which thermostat sensor in remote controller can be used so that suction temperature is higher than the preset temperature.



■ **Ex: When heating**

Assuming the preset temperature in the figure above is 24°C, and the suction temperature has changed from 18°C to 28°C (A → F):

(This example also assumes there are several other air conditioners, the UM Series is off, and that temperature changes even when the thermostat sensor is off.)

Body thermostat sensor is used for temperatures from 18°C to 25°C (A → C).

Remote controller thermostat sensor is used for temperatures from 25°C to 28°C (C → E).

And, assuming suction temperature has changed from 28°C to 18°C (D → A):

Remote controller thermostat sensor is used for temperatures from 28°C to 23°C (D → B).

Body thermostat sensor is used for temperatures from 23°C to 18°C (B → A).

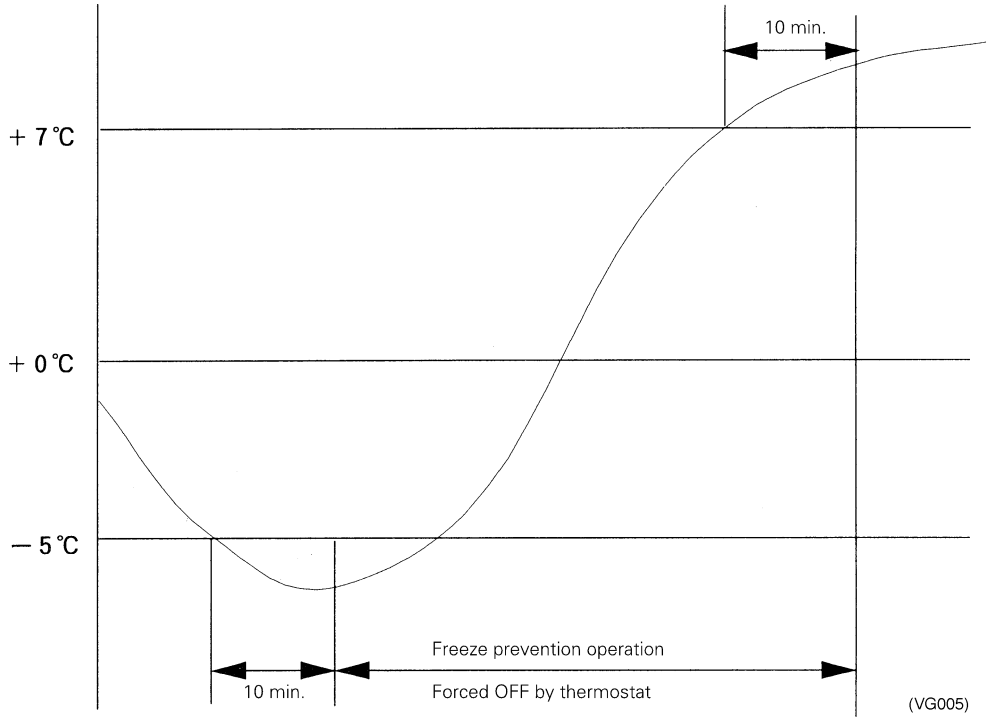
1.24 Freeze Prevention

Freeze Prevention by Off Cycle (Indoor Unit)

When the temperature detected by liquid pipe temperature thermistor (R2T) of the indoor unit heat exchanger drops too low, the unit enters freeze prevention operation in accordance with the following conditions, and is also set in accordance with the conditions given below.

Conditions for starting freeze prevention: Temperature is -1°C or less for total of 40 min., or temperature is -5°C or less for total of 10 min.
Conditions for stopping freeze prevention: Temperature is +7°C or more for 10 min. continuously

Ex: Case where temperature is -5°C or less for total of 10 min.



Part 3
Test Operation

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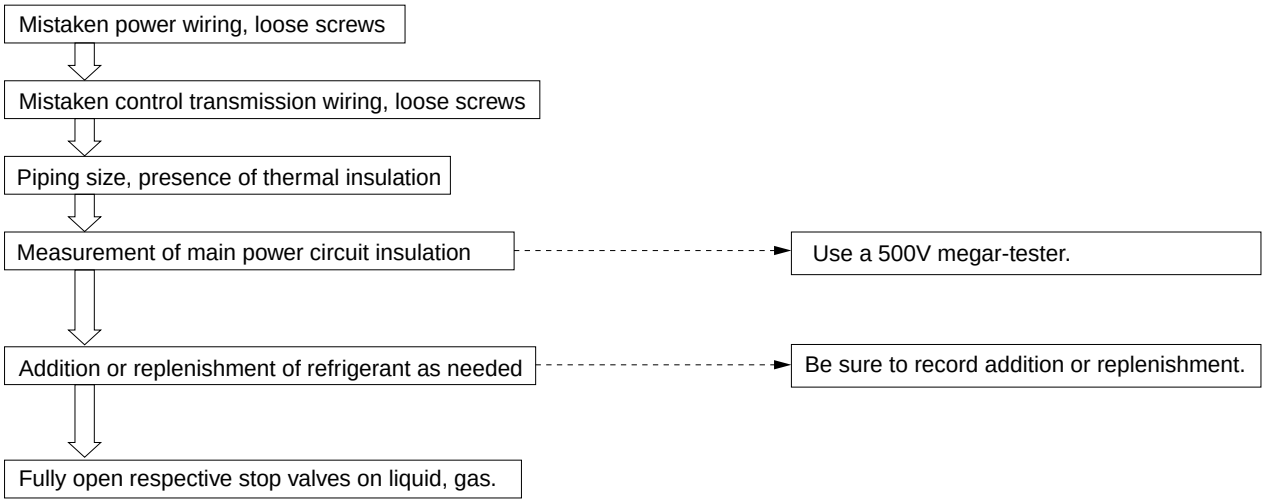
1. Test Operation

1.1 Procedure and Outline

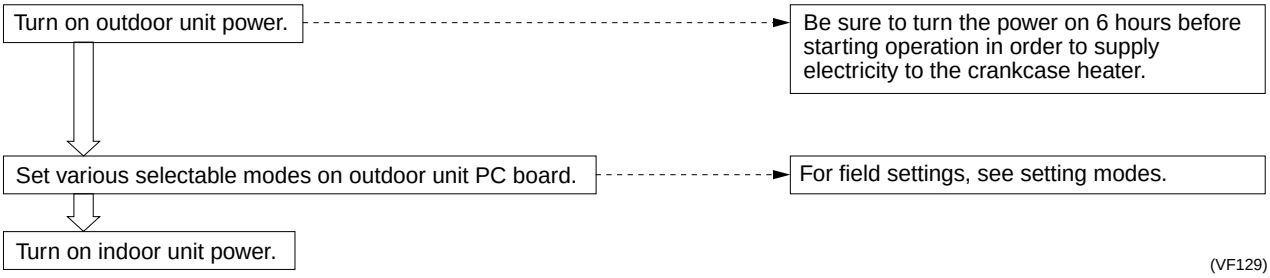
The operation sequence is the most important thing for test operation. Follow the following outline.

1.1.1 Check The Following Before Turning Power On.


Mistaken power wiring, loose screws
Mistaken control transmission wiring, loose screws
Piping size, presence of thermal insulation
Measurement of main power circuit insulation
Use a 500V megar-tester.
Addition or replenishment of refrigerant as needed
Be sure to record addition or replenishment.
Fully open respective stop valves on liquid, gas.

(VF128)

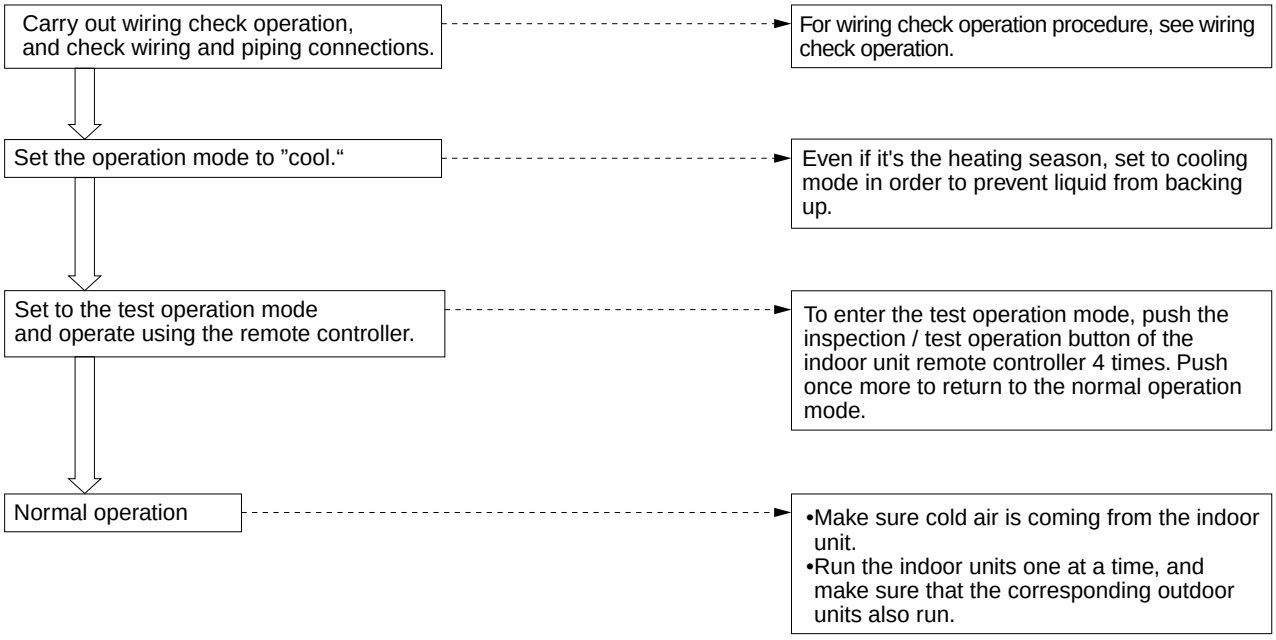
1.1.2 Turn Power On.


Turn on outdoor unit power.
Be sure to turn the power on 6 hours before starting operation in order to supply electricity to the crankcase heater.
Set various selectable modes on outdoor unit PC board.
For field settings, see setting modes.
Turn on indoor unit power.

(VF129)

Note: Refer to Setting Modes on P281,288

1.1.3 Check Operation.


Carry out wiring check operation, and check wiring and piping connections.
For wiring check operation procedure, see wiring check operation.
Set the operation mode to ”cool.“
Even if it's the heating season, set to cooling mode in order to prevent liquid from backing up.
Set to the test operation mode and operate using the remote controller.
To enter the test operation mode, push the inspection / test operation button of the indoor unit remote controller 4 times. Push once more to return to the normal operation mode.
Normal operation
•Make sure cold air is coming from the indoor unit.
•Run the indoor units one at a time, and make sure that the corresponding outdoor units also run.

(VF130)

Note: Refer to Wiring Check Operation on P315

Caution
When the 400 volt power supply is applyed to "N" phase by mistake, replace Inverter P.C.B (A2P) and control transformer (T1R, T2R) in switch box together.

(V0847)

1.2 When Power is Turned On

1.2.1 When Turning Power on the First Time

The unit will not run for up to 12 minutes in order for master power supply and address (indoor unit address, etc.) to be set automatically.

Outdoor unit
LED HWL (H2P) ..... On
Test lamp (H2P) ..... Flicker
Can be set while in operation.

Indoor unit
“UH” malfunction code flickers when the ON/OFF button is pushed during the aforementioned operation.
(Returns to normal when automatic setting is complete.)

1.2.2 When Turning Power on after the First Time

* Tap the RESET button on the outdoor unit PC Board. The unit can be operated after setting up for about two minutes.

If the RESET button is not pushed, the unit will not run for up to 10 minutes in order for master power supply to be set automatically.

Outdoor unit
LED HWL (H2P) ..... On
Test lamp (H2P) ..... Flicker
Can be set while in operation.

Indoor unit
If the ON/OFF button is pushed during the aforementioned operation, the operation lamp lights but the unit will not run.
(Returns to normal when automatic setting is complete.)

1.2.3 If outdoor, indoor or HR box is extended, or if indoor/outdoor unit PC board is replaced:

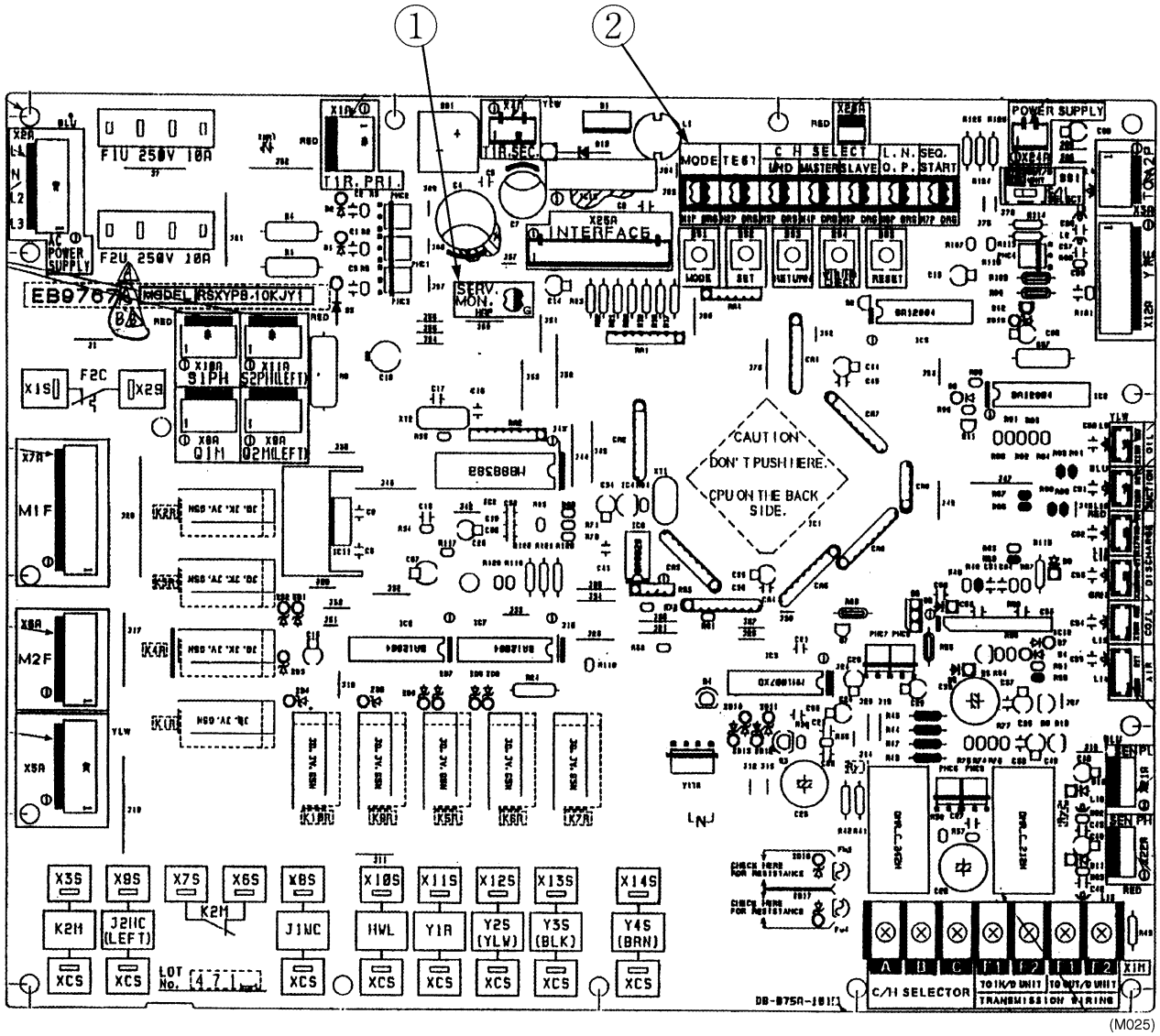
In these cases, be sure to push and hold the RESET button for 5 seconds or more. The system will not recognize the extension if this operation is not performed. The unit will not run for up to 12 minutes in order for the addresses (indoor unit address, etc.) to be set automatically.

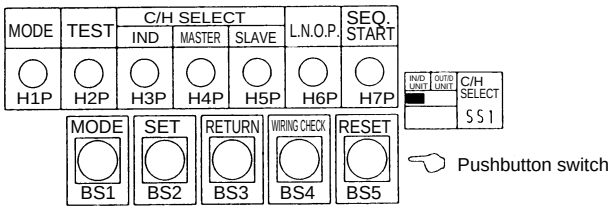
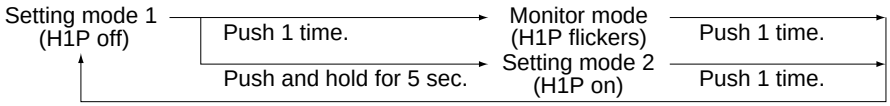
Outdoor unit
LED HWL (H2P) ..... On
Test lamp (H2P) ..... OFF
Can be set while in operation.

Indoor unit
“UH” or “U4” malfunction code flickers when the ON/OFF button is pushed during the aforementioned operation.
(Returns to normal when automatic setting is complete.)

1.3 Outdoor Unit PC Board Ass'y

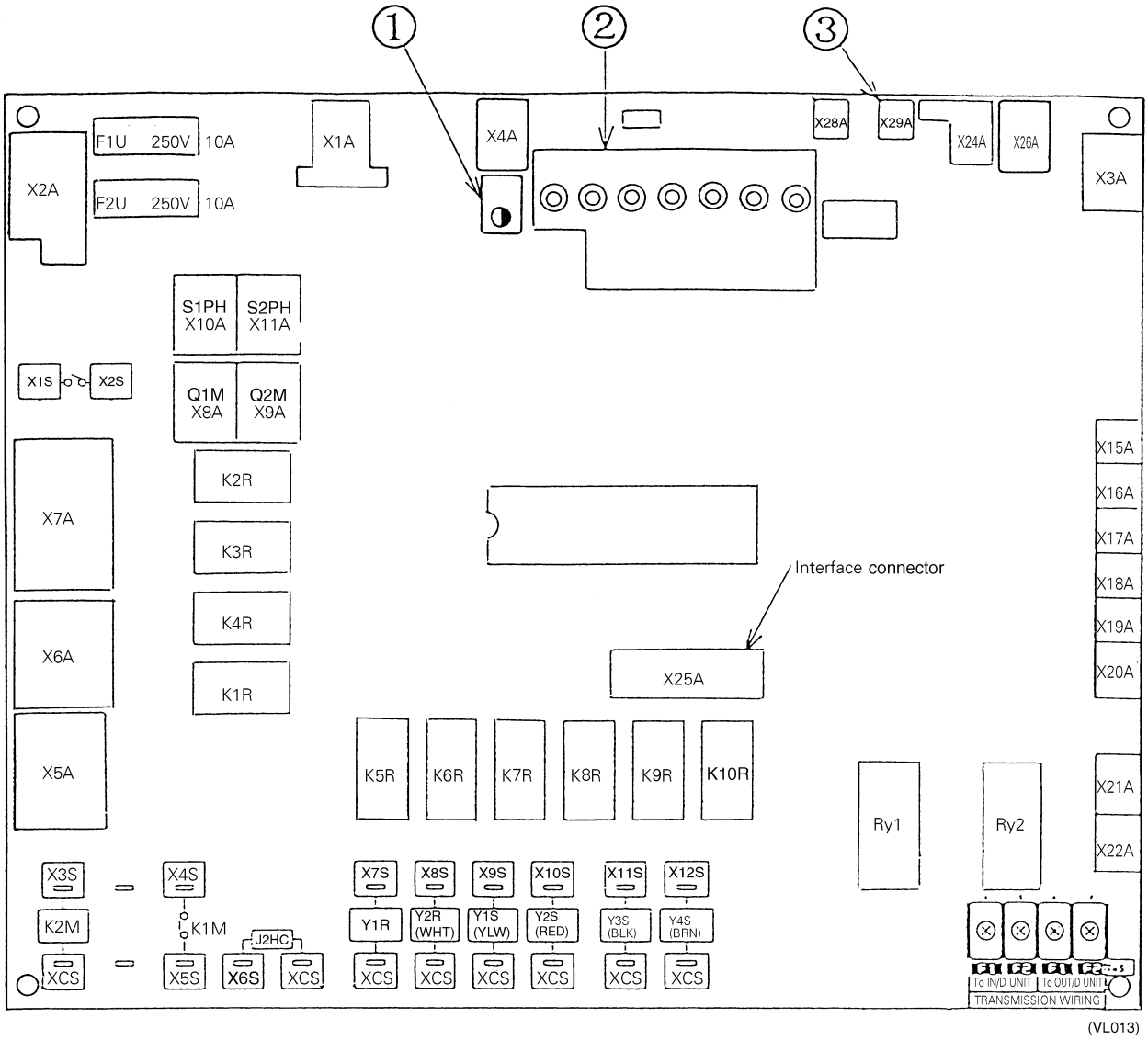
1.3.1 CU-8·10MX1SPP



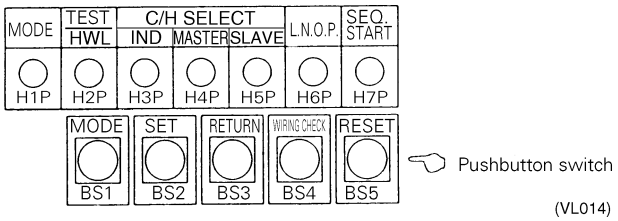
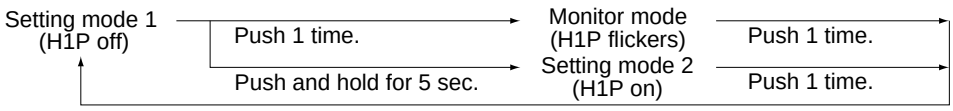
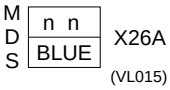
	Service monitor <HAP> (Green)	Normal ·····Flicker Malfunction ·····On or off
	Function setting switch or LED LED display ○ : On ◑ : Flicker ● : Off	 Mode button ·····Mode change  · Set return button ·····Changes or enters address or data. · Wiring check button ···Push and hold for 5 sec. to start wiring check. · Reset button ·····Push and hold for 5 sec. if the indoor unit's PC board has been replaced, or there has been a change in the combination of indoor and outdoor units, such as indoor unit extension, etc.

(M026)

1.3.2 CU-8·10ME1XPK (Heat Recovery)



(VL013)

1	Service monitor <HAP> (Green)	Normal ..... Flicker Malfunction ..... On or off
2	Function setting switch or LED LED display ○ : On ◑ : Flicker ● : Off	 (VL014) Mode button ..... Mode change  (VF014) • Set return button ..... Changes or enters address or data. • Wiring check button .... Push and hold for 5 sec. to start wiring check. • Reset button ..... Push and hold for 5 sec. if the indoor unit's PC board has been replaced, or there has been a change in the combination of indoor and outdoor units, such as indoor unit extension, etc.
3	Jumper pin  (VL015)	Forced defrost operation by short circuit.

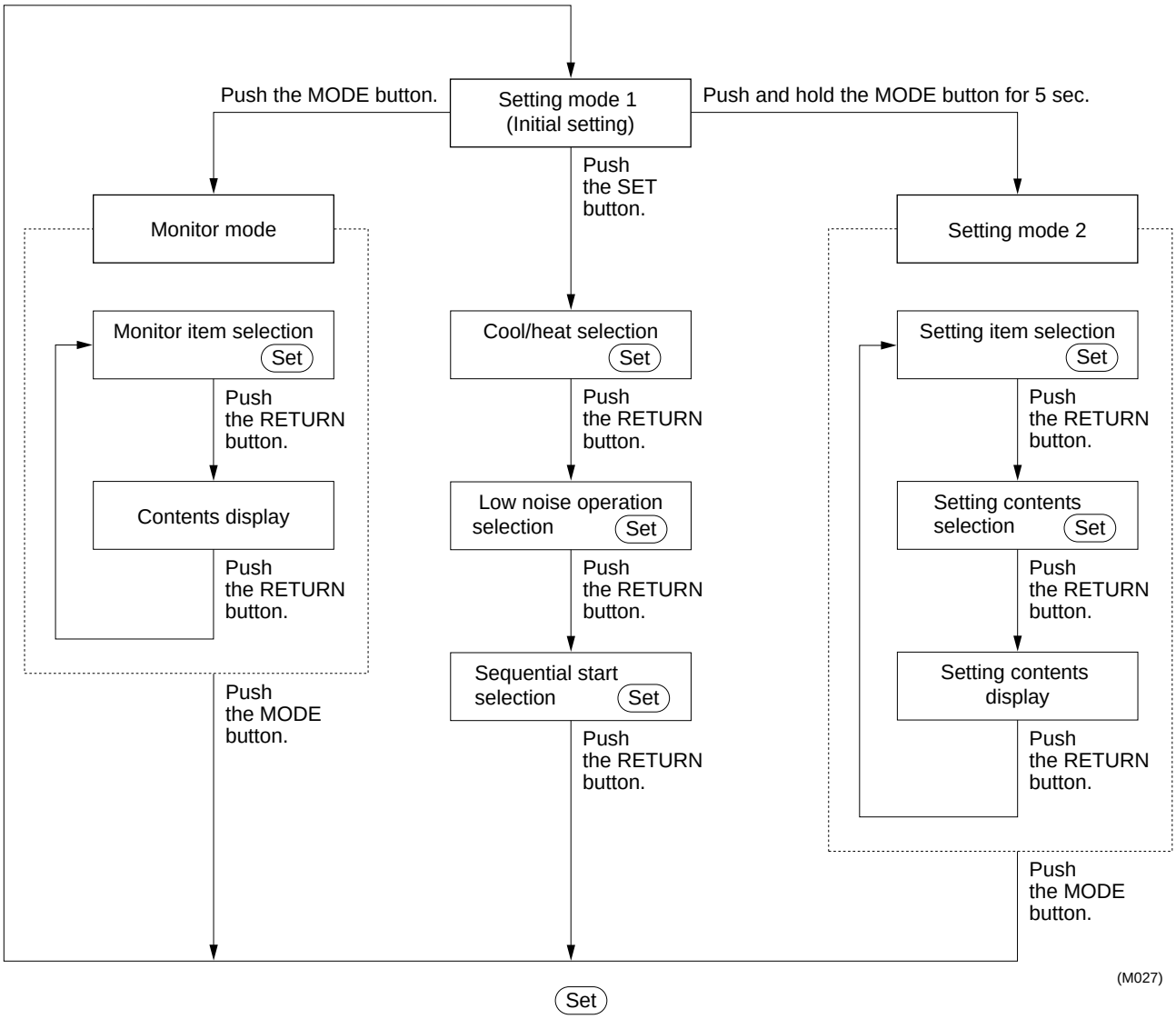
1.4 Setting Modes (MX1R Series)

The three setting modes are as follows:

- **Setting mode 1** ..... Mode for selecting cool/heat setting method, and whether or not to use low noise operation and sequential start.
  (H1P off)
- **Setting mode 2** ..... Mode for changing operating status and setting addresses; used primarily for service.
  (H1P on)
- **Monitor mode** ..... Mode for checking setting made in the setting modes, number of connected units, etc.
  (H1P flickers)

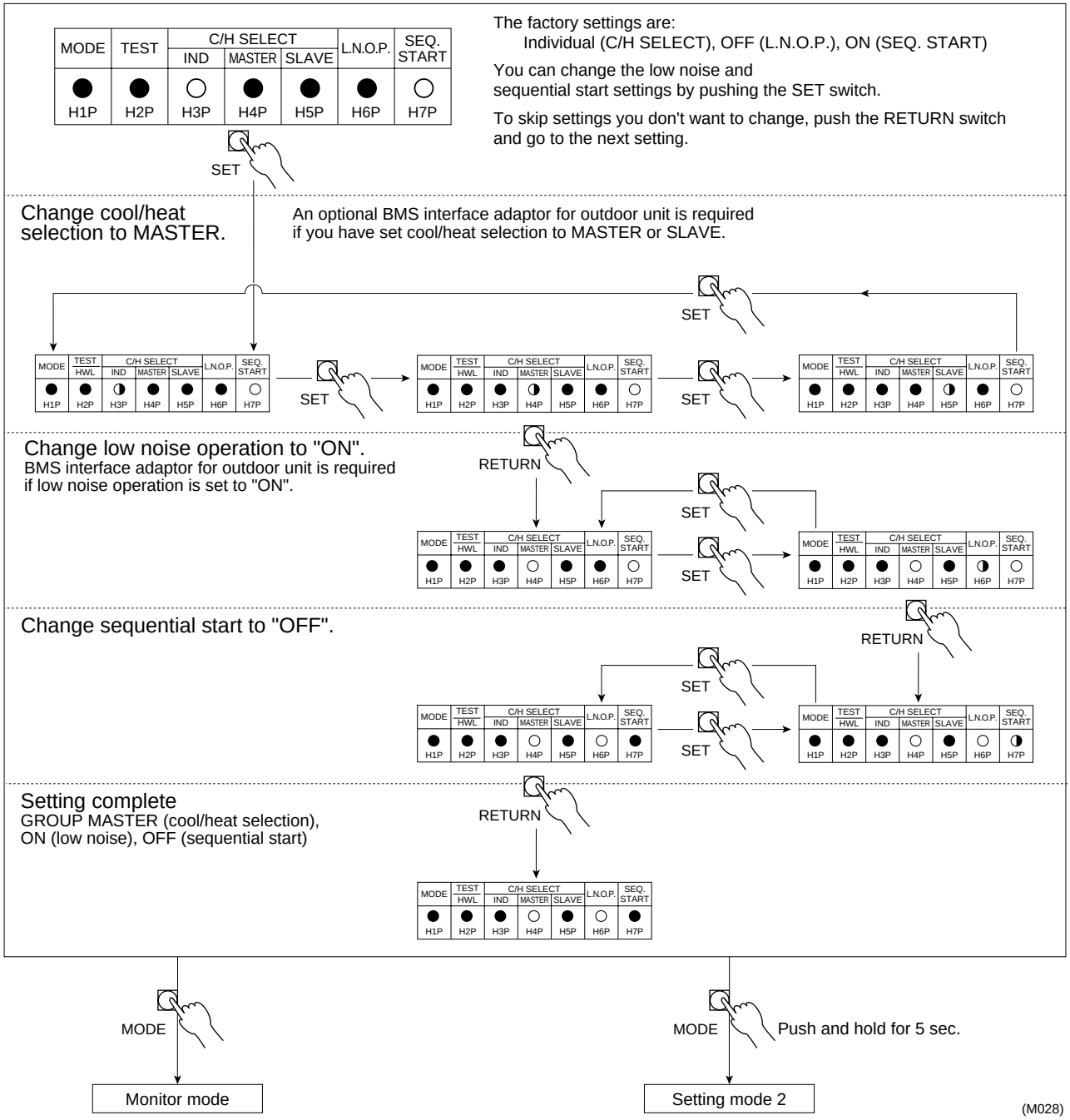
Mode Changing Procedure

The flow of the setting modes is as follows. (See the following pages for details.)



- You can make your selections with the SET button.
- **If you become unsure of how to proceed, push the MODE button and return to setting mode 1.**
- You don't have to perform power supply reset after changing settings in setting mode 1 (including [SS1] cool/heat selection switch on the outdoor unit PC board) and setting mode 2.

1.4.1 Setting Mode 1


MODE
TEST
C/H SELECT
IND
MASTER
SLAVE
L.N.O.P.
SEQ. START
H1P
H2P
H3P
H4P
H5P
H6P
H7P
SET
The factory settings are:
Individual (C/H SELECT), OFF (L.N.O.P.), ON (SEQ. START)
You can change the low noise and sequential start settings by pushing the SET switch.
To skip settings you don't want to change, push the RETURN switch and go to the next setting.
Change cool/heat selection to MASTER.
An optional BMS interface adaptor for outdoor unit is required if you have set cool/heat selection to MASTER or SLAVE.
Change low noise operation to "ON".
BMS interface adaptor for outdoor unit is required if low noise operation is set to "ON".
RETURN
Change sequential start to "OFF".
Setting complete
GROUP MASTER (cool/heat selection), ON (low noise), OFF (sequential start)
MODE
Monitor mode
Push and hold for 5 sec.
Setting mode 2
(M028)

Note:
1. CU-5 is completed by low noise setting.
2. BMS interface adaptor for outdoor unit is required if cool/heat selection set to MASTER or SLAVE, or if low noise operation is set to ON. For further information, see page 295.

1.4.2 Setting Mode 2

To enter setting mode 2 from setting mode 1 (normal), you must push and hold the MODE button (BS1) for 5 seconds. (Setting mode 2 cannot be entered while still making settings in setting mode 1.)

Setting Procedure

1. Push the SET button and match with the setting item (LED display). (All 10 settings)
↓
2. Push the RETURN button (BS3) and the present settings flicker (LED display).
↓
3. Push the SET button (BS2) and match with each setting (LED flicker display).
↓
4. Push the RETURN button (BS3) and enter the settings.
↓
5. Push the RETURN button (BS3) and return to the initial status.

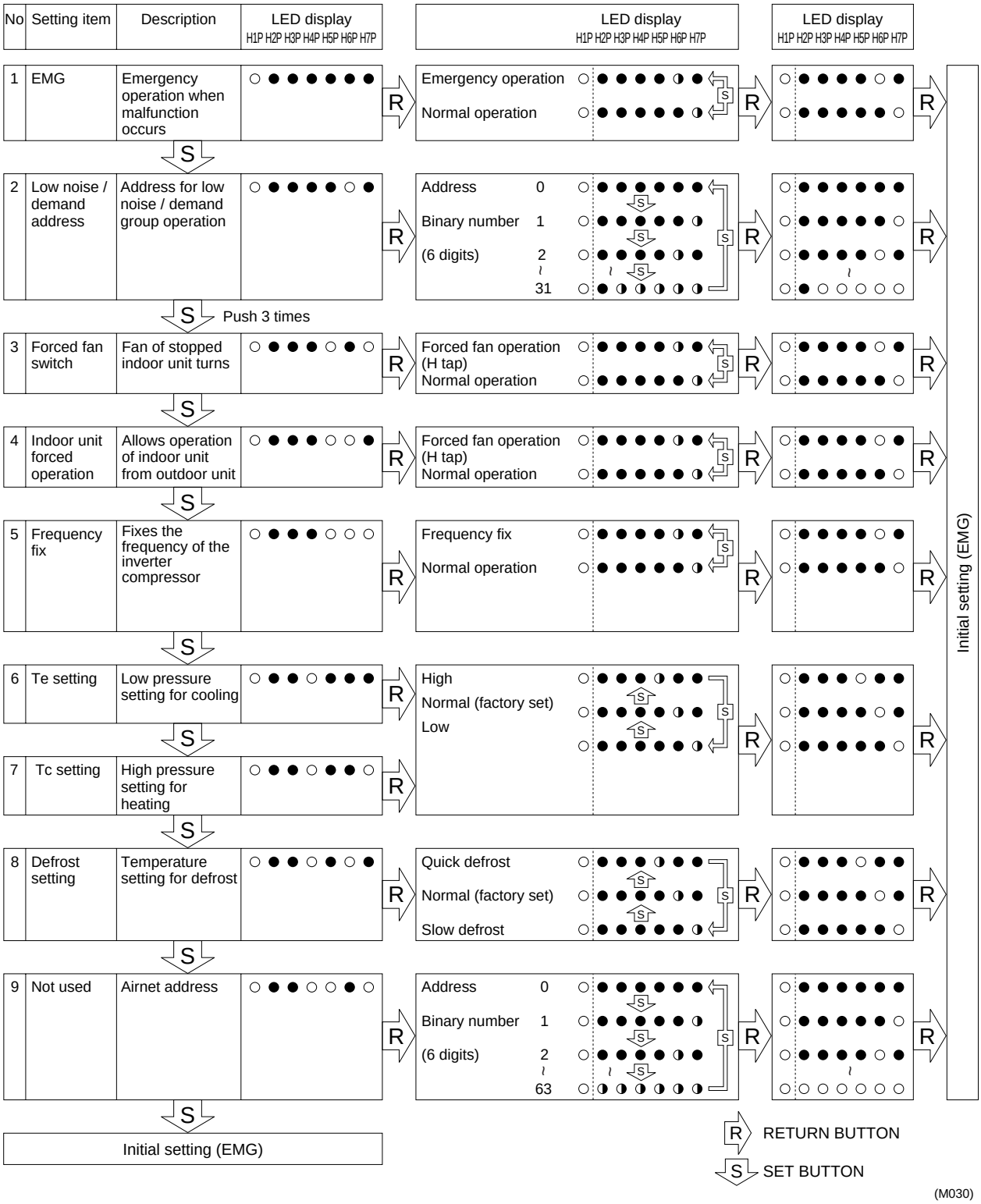
Note:
- If you become unsure of how to proceed, push the MODE button (BS1) and return to setting mode 1.
- The initial status of setting mode 2 is the status of setting item No. 1 in mode 2.

Setting Items

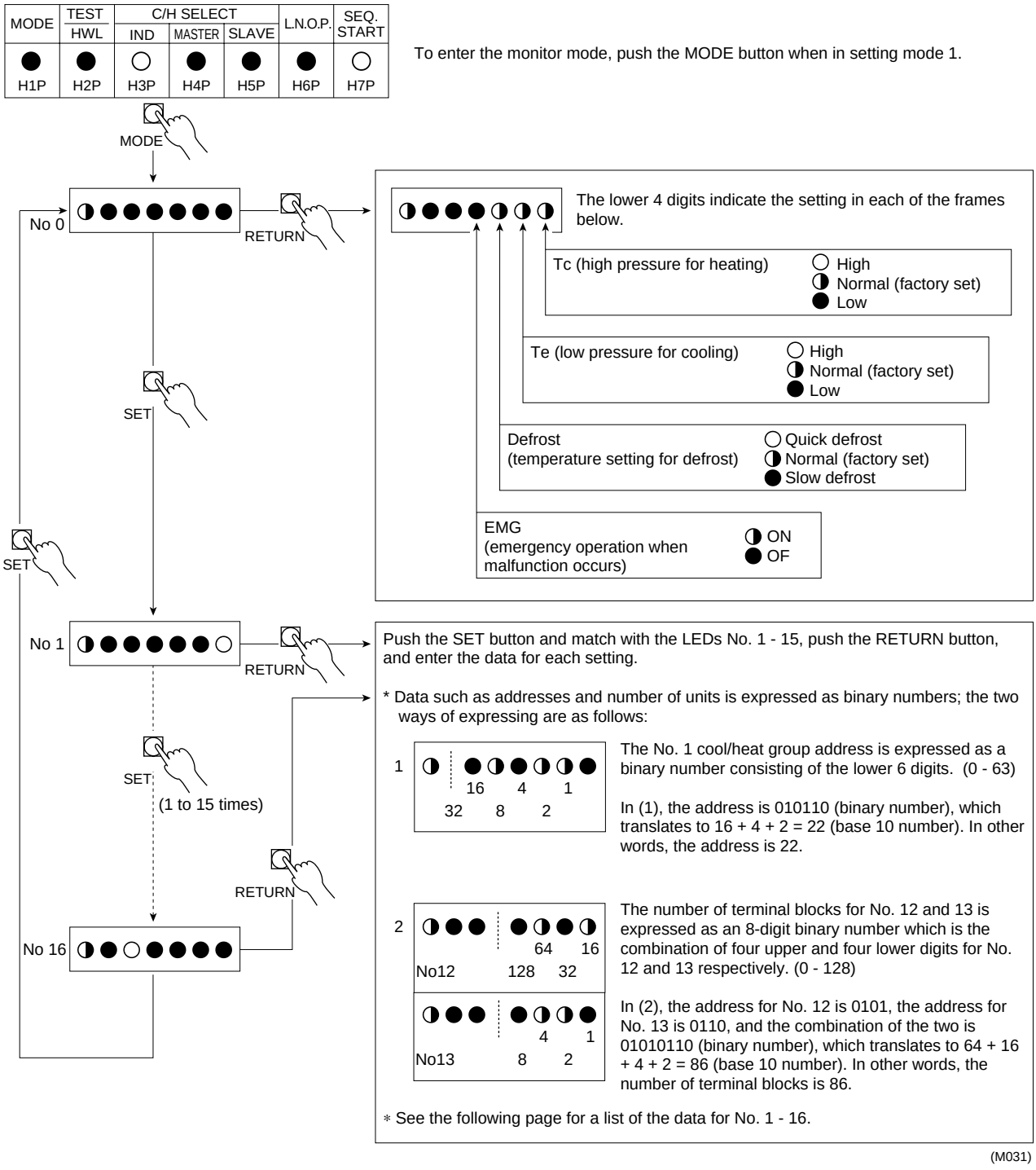
	Setting item	Description	LED display H1P H2P H3P H4P H5P H6P H7P		LED display H1P H2P H3P H4P H5P H6P H7P
1	EMG	Emergency operation when malfunction occurs	○ ● ● ● ● ● ●	Emergency operation (Runs only by standard compressor) Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
2	Low noise / demand address	Address for low noise / demand group operation	○ ● ● ● ● ○ ●	Address 0 Binary number 1 (6 digits) 2 〜 31	○ ● ● ● ● ● ● ○ ● ● ● ● ● ○ ○ ● ● ● ● ○ ● 〜 〜 ○ ● ○ ○ ○ ○ ○
3	Forced fan switch	Fan of stopped indoor unit turns	○ ● ● ● ○ ● ○	Forced fan operation (H tap) Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
4	Indoor unit forced operation	Allows operation of indoor unit from outdoor unit	○ ● ● ● ○ ○ ●	Indoor unit forced operation Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
5	Frequency fix	Fixes the frequency of the inverter compressor 5HP···68Hz 8.10HP··86Hz+ON	○ ● ● ● ○ ○ ○	Frequency fix Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
6	Te setting	Low pressure setting for cooling	○ ● ● ○ ● ● ●	High Normal (factory set) Low	○ ● ● ● ○ ● ● ○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
7	Tc setting	High pressure setting for heating	○ ● ● ○ ● ● ○		
8	Defrost setting	Temperature setting for defrost	○ ● ● ○ ● ○ ●	Quick defrost Normal (factory set) Slow defrost	○ ● ● ● ○ ● ● ○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
9	Not used	Airnet address	○ ● ● ○ ○ ● ○	Address 0 Binary number 1 (6 digits) 2 〜 63	○ ● ● ● ● ● ● ○ ● ● ● ● ● ○ ○ ● ● ● ● ○ ● 〜 〜 ○ ○ ○ ○ ○ ○ ○

(M029)

Note: ∗ 1: Cannot be set with CU-5.


No
Setting item
Description
LED display
H1P H2P H3P H4P H5P H6P H7P
1
EMG
Emergency operation when malfunction occurs
Emergency operation
Normal operation
2
Low noise / demand address
Address for low noise / demand group operation
Address
Binary number
(6 digits)
0
1
2
31
Push 3 times
3
Forced fan switch
Fan of stopped indoor unit turns
Forced fan operation (H tap)
Normal operation
4
Indoor unit forced operation
Allows operation of indoor unit from outdoor unit
Forced fan operation (H tap)
Normal operation
5
Frequency fix
Fixes the frequency of the inverter compressor
Frequency fix
Normal operation
6
Te setting
Low pressure setting for cooling
High
Normal (factory set)
Low
7
Tc setting
High pressure setting for heating
8
Defrost setting
Temperature setting for defrost
Quick defrost
Normal (factory set)
Slow defrost
9
Not used
Airnet address
Address
Binary number
(6 digits)
0
1
2
63
Initial setting (EMG)
R RETURN BUTTON
S SET BUTTON
(M030)

1.4.3 Monitor Mode


MODE
TEST
HWL
C/H SELECT
IND
MASTER
SLAVE
L.N.O.P.
SEQ. START
H1P
H2P
H3P
H4P
H5P
H6P
H7P
To enter the monitor mode, push the MODE button when in setting mode 1.
MODE
No 0
RETURN
The lower 4 digits indicate the setting in each of the frames below.
Tc (high pressure for heating)
High
Normal (factory set)
Low
Te (low pressure for cooling)
High
Normal (factory set)
Low
Defrost
(temperature setting for defrost)
Quick defrost
Normal (factory set)
Slow defrost
EMG
(emergency operation when malfunction occurs)
ON
OF
SET
SET
No 1
RETURN
Push the SET button and match with the LEDs No. 1 - 15, push the RETURN button, and enter the data for each setting.
* Data such as addresses and number of units is expressed as binary numbers; the two ways of expressing are as follows:
1
16 4 1
32 8 2
The No. 1 cool/heat group address is expressed as a binary number consisting of the lower 6 digits. (0 - 63)
In (1), the address is 010110 (binary number), which translates to 16 + 4 + 2 = 22 (base 10 number). In other words, the address is 22.
SET
(1 to 15 times)
RETURN
No 16
2
64 16
No12 128 32
4 1
No13 8 2
The number of terminal blocks for No. 12 and 13 is expressed as an 8-digit binary number which is the combination of four upper and four lower digits for No. 12 and 13 respectively. (0 - 128)
In (2), the address for No. 12 is 0101, the address for No. 13 is 0110, and the combination of the two is 01010110 (binary number), which translates to 64 + 16 + 4 + 2 = 86 (base 10 number). In other words, the number of terminal blocks is 86.
* See the following page for a list of the data for No. 1 - 16.

(M031)

- After making sure the data is correct, push the RETURN button and return to No. 0, or push the MODE button and return to setting mode 1.

Monitor Mode Data

Mode No.	LED	Data	Display method	Size (binary number)
No 1	○●●●●○	Cool/heat group address	0 ~ 31	Lower 6 digits
No 2	○●●●●○●	Low noise / demand address	0 ~ 31	Lower 6 digits
No 3	○●●●●○○	Not used		
No 4	○●●●○●●	Not used	0 ~ 63	Lower 6 digits
No 5	○●●●○●○	Number of connected units	0 ~ 63 units	Lower 6 digits
No 6	○●●●○○●	Number of connected HR box	0 ~ 63 units	Lower 6 digits
No 7	○●●●○○○	Number of connected zone units (excluding outdoor and HR box)	0 ~ 63 units	Lower 6 digits
No 8	○●●○●●●	Number of outdoor units	0 ~ 63 units	Lower 6 digits
No 9	○●●○●●○	Number of HR box	0 ~ 128 units	Lower 4 digits, upper
No 10	○●●○●○●	Number of HR box	0 ~ 128 units	Lower 4 digits, lower
No 11	○●●○●○○	Number of zone units (excluding outdoor and HR box)	0 ~ 63 units	Lower 6 digits
No 12	○●●○○●●	Number of terminal blocks	0 ~ 128 units	Lower 4 digits, upper
No 13	○●●○○●○	Number of terminal blocks	0 ~ 128 units	Lower 4 digits, lower
No 14	○●●○○○●	Not used		
No 15	○●●○○○○	Not used		
No 16	○●○●●●●	Not used		

1.4.4 Additional Refrigerant Charge Operation Procedure

[Work procedure]

1. Conduct a normal refrigerant charge operation.
   With the outdoor unit stopped, charge refrigerant from the service port of the liquid-side stop valve.
   (Keep the liquid-side and gas-side stop valves open.)

∗ Conduct the following operation only when the required amount of refrigerant could not be supplied by a charge operation performed with the outdoor unit in non-operating condition.

2. Turn on the main switches of the indoor and outdoor units, and fully open the gas-side stop valve.
   (Be sure to keep the liquid-side stop valve closed.)
3. Set the service mode.

In setting mode 1, depress NEXT PAGE button for 5 seconds to set to setting mode 2.		○ ● ● ● ● ● ●
Press OPERATION button to set LEDs for additional refrigerant charge operation indication.		○ ● ○ ● ○ ● ●
Press CONFIRM button.		○ ● ● ● ● ● ◑
Press OPERATION button to set LED indication as shown at the right.		○ ● ● ● ● ◑ ●
Press CONFIRM button to enter setting.		○ ● ● ● ● ○ ●
Press CONFIRM button again to start operation.		○ ◑ ● ● ● ● ●
Low pressure level is indicated during operation.	3.5 k or higher	○ ○ ● ○ ○ ○ ○
	3.5 k or lower	○ ○ ● ● ○ ○ ○
	2.5 k or lower	○ ○ ● ● ● ○ ○
	1.5 k or lower	○ ○ ● ● ● ● ○
Indication after operation stops (operation stops after 30 minutes). (Flashing LEDs indicate pressure level immediately before operation stops.)		○ ○ ● ● ● ◑ ◑ This indication shows that pressure level was "2.5 k or lower" immediately before operation stopped.

4. The additional refrigerant charge operation is complete when the required amount of refrigerant is charged. If the charging operation does not complete in 30 minutes, make the settings again and operate the equipment.
   (If the CONFIRM button is pressed during an additional refrigerant charge operation, the equipment stops operating.)
5. Remove the refrigerant charge hose, then fully open the liquid-side stop valve.

1.4.5 Refrigerant Recovery Mode

∗ This mode holds the electronic expansion valves of indoor and outdoor units fully open for the recovery of refrigerant.

[Work procedure]

1. Stop air conditioner operations.
2. Set the service mode.

In setting mode 1, depress NEXT PAGE button for 5 seconds to set to setting mode 2.	○ ● ● ● ● ● ●
Press OPERATION button to set LEDs for refrigerant recovery mode indication.	○ ● ○ ● ○ ● ○
Press CONFIRM button.	○ ● ● ● ● ● ◑
Press OPERATION button to set LED indication as shown at the right.	○ ● ● ● ● ◑ ●
Press CONFIRM button to enter setting.	○ ● ● ● ● ○ ●
Press CONFIRM button again to set to initial condition.	○ ● ● ● ● ● ●

3. Turn off the main switches of the indoor and outdoor units.
   (Be sure to turn off the main switches of all units within 10 minutes after the first unit is turned off.)
4. Conduct a refrigerant recovery operation.

∗ Cancel the setting in the setting mode, or cancel the mode by resetting the outdoor unit using the power switch.

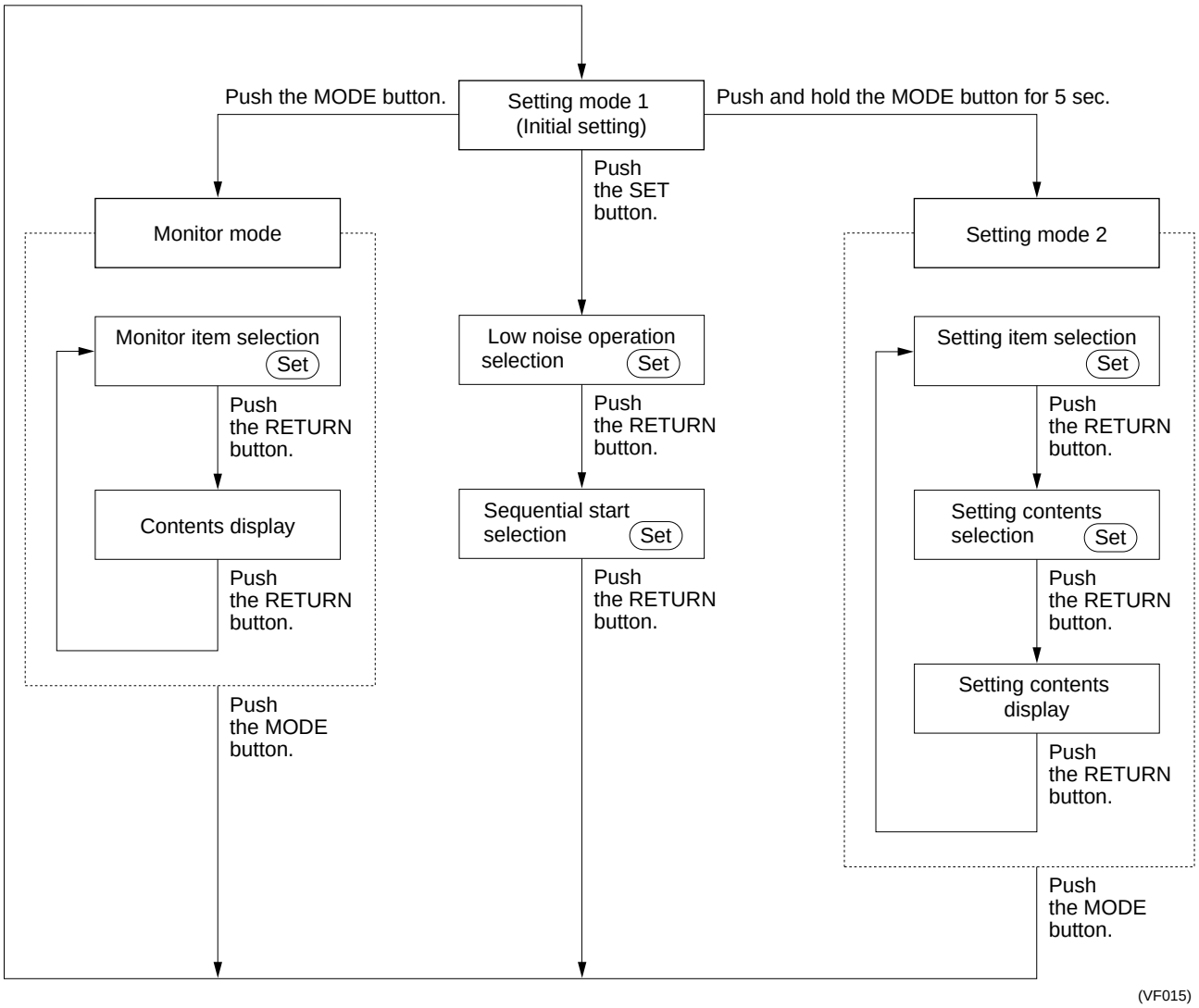
1.5 Setting Modes (ME1R Series)

The three setting modes are as follows:

- **Setting mode 1** ..... Mode for selecting cool/heat setting method, and whether or not to use low noise operation and sequential start.
  (H1P off)
- **Setting mode 2** ..... Mode for changing operating status and setting addresses; used primarily for service.
  (H1P on)
- **Monitor mode** ..... Mode for checking setting made in the setting modes, number of connected units, etc.
  (H1P flickers)

Mode Changing Procedure

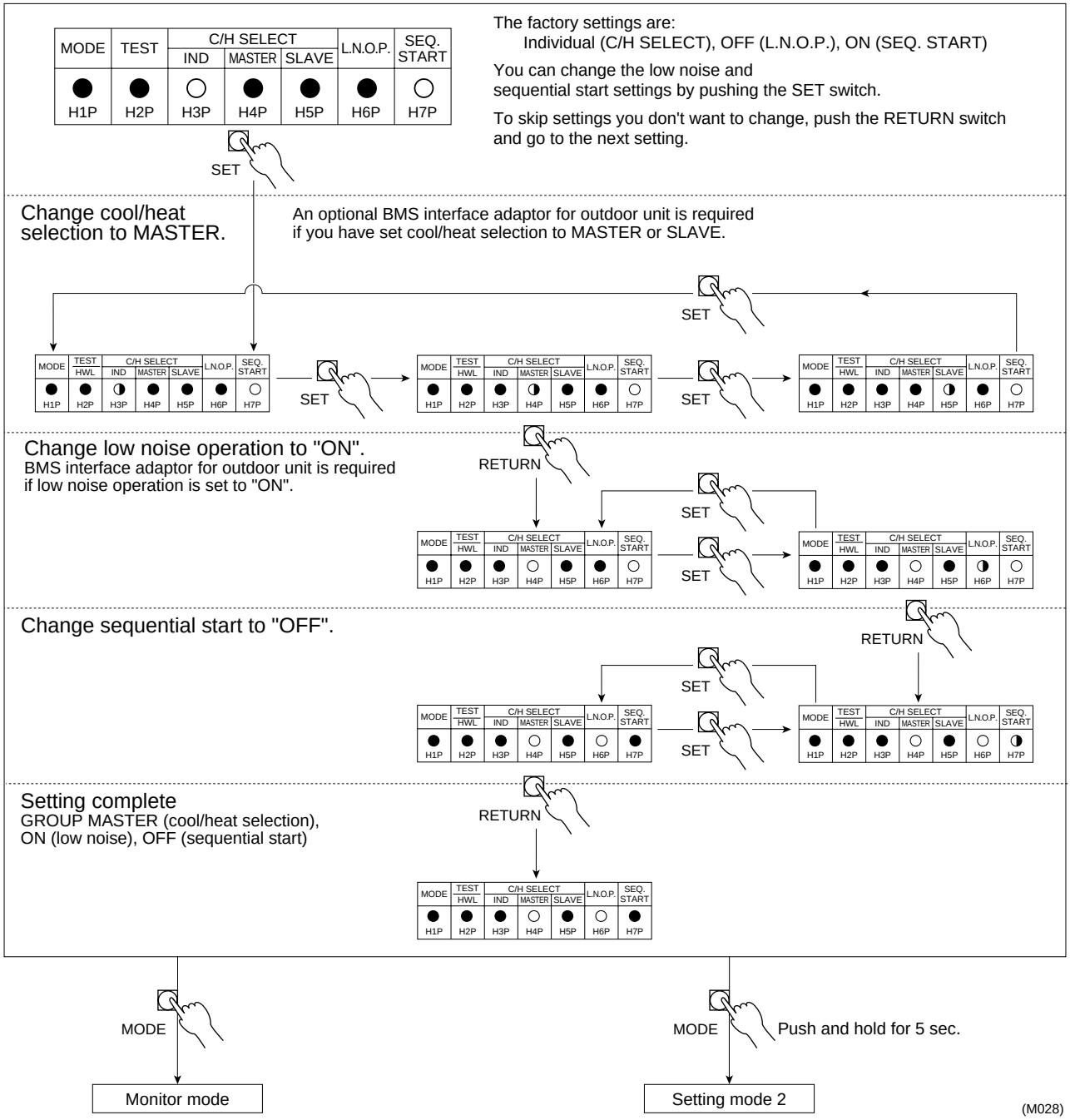
The flow of the setting modes is as follows. (See the following pages for details.)



(VF015)

- You can make your selections with the SET button (Set) .
- **If you become unsure of how to proceed, push the MODE button and return to setting mode 1.**
- You don't have to perform power supply reset after changing settings in setting mode 1 (including [SS1] cool/heat selection switch on the outdoor unit PC board) and setting mode 2.

1.5.1 Setting Mode 1


MODE
TEST
C/H SELECT
IND
MASTER
SLAVE
L.N.O.P.
SEQ. START
H1P
H2P
H3P
H4P
H5P
H6P
H7P
SET
The factory settings are:
Individual (C/H SELECT), OFF (L.N.O.P.), ON (SEQ. START)
You can change the low noise and sequential start settings by pushing the SET switch.
To skip settings you don't want to change, push the RETURN switch and go to the next setting.
Change cool/heat selection to MASTER.
An optional BMS interface adaptor for outdoor unit is required if you have set cool/heat selection to MASTER or SLAVE.
Change low noise operation to "ON".
BMS interface adaptor for outdoor unit is required if low noise operation is set to "ON".
RETURN
Change sequential start to "OFF".
Setting complete
GROUP MASTER (cool/heat selection), ON (low noise), OFF (sequential start)
MODE
Monitor mode
Push and hold for 5 sec.
Setting mode 2
(M028)

1.5.2 Setting Mode 2

To enter setting mode 2 from setting mode 1 (normal), you must push and hold the MODE button (BS1) for 5 seconds. (Setting mode 2 cannot be entered while still making settings in setting mode 1.)

Setting procedure

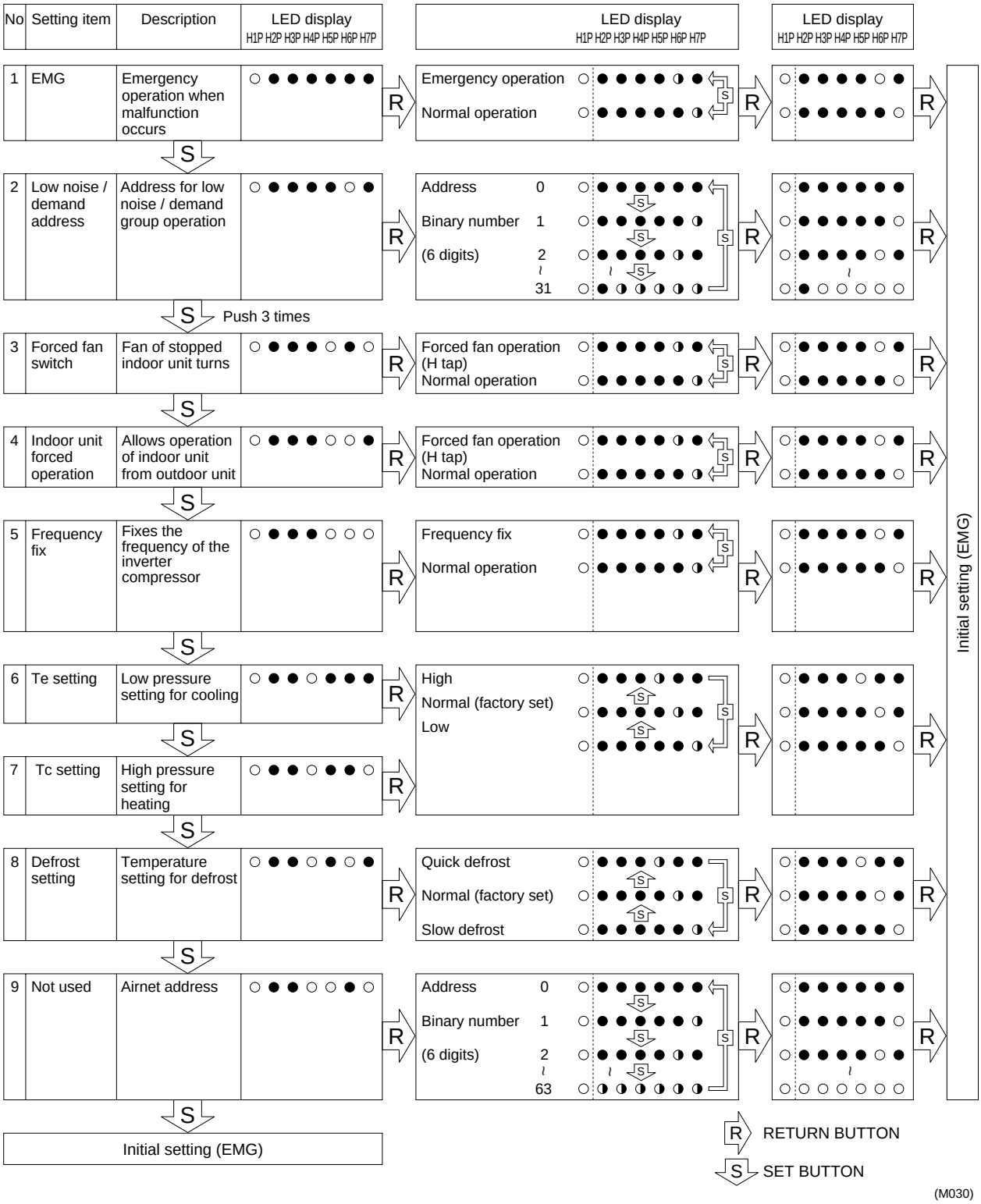
1. Push the SET button and match with the setting item (LED display). (All 9 settings)
↓
2. Push the RETURN button (BS3) and the present settings flicker (LED display).
↓
3. Push the SET button (BS2) and match with each setting (LED flicker display).
↓
4. Push the RETURN button (BS3) and enter the settings.
↓
5. Push the RETURN button (BS3) and return to the initial status.

Note:
- If you become unsure of how to proceed, push the MODE button (BS1) and return to setting mode 1.
- The initial status of setting mode 2 is the status of setting item No. 1 in mode 2.

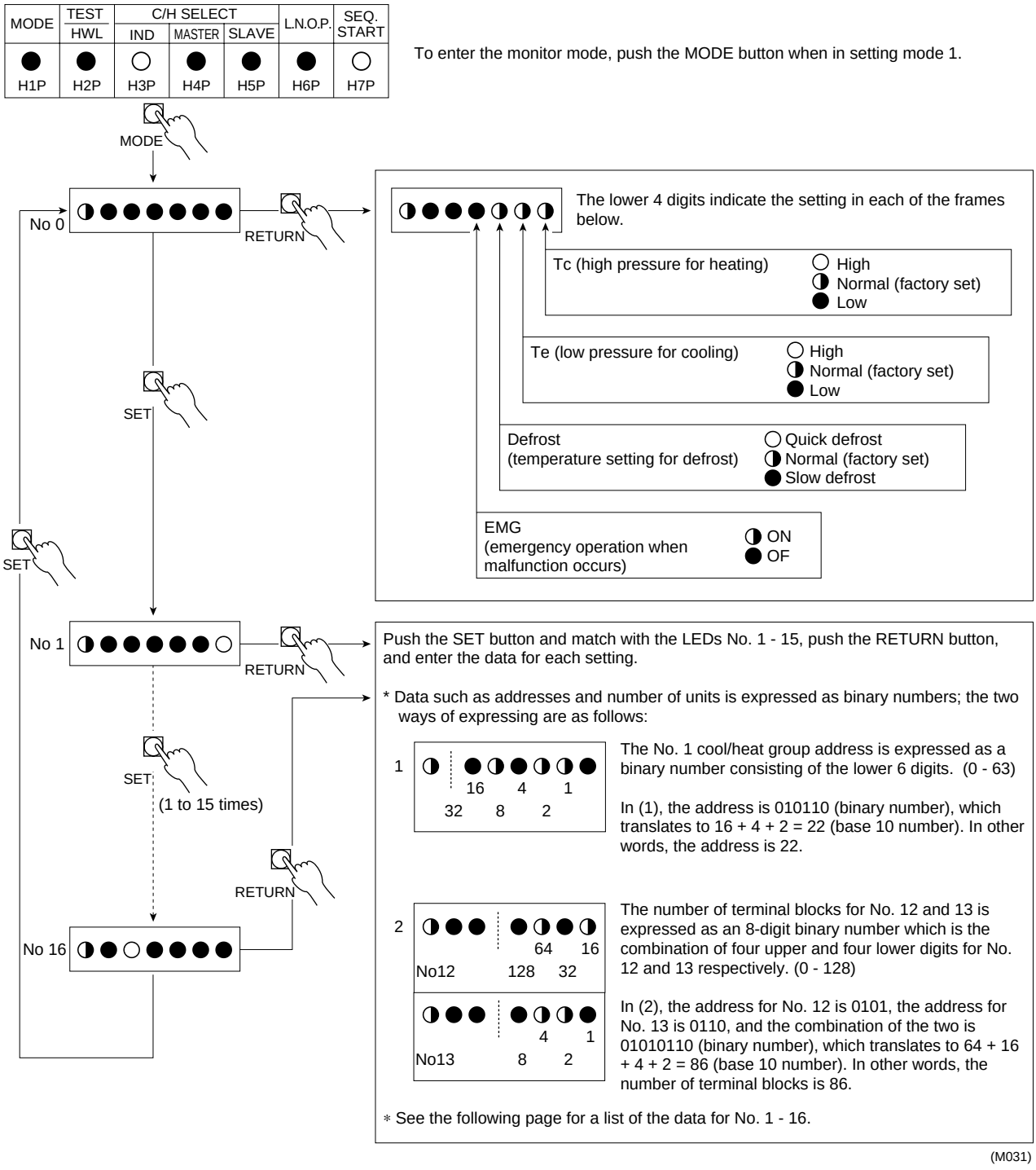
Setting items

	Setting item	Description	LED display H1P H2P H3P H4P H5P H6P H7P		LED display H1P H2P H3P H4P H5P H6P H7P
1	EMG	Emergency operation when malfunction occurs	○ ● ● ● ● ● ●	Emergency operation (Runs only by standard compressor) Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
2	Low noise / demand address	Address for low noise / demand group operation	○ ● ● ● ● ○ ●	Address 0 Binary number 1 (6 digits) 2 〃 31	○ ● ● ● ● ● ● ○ ● ● ● ● ● ○ ○ ● ● ● ● ○ ● 〃 〃 ○ ● ○ ○ ○ ○ ○
3	Forced fan switch	Fan of stopped indoor unit turns	○ ● ● ● ○ ● ○	Forced fan operation (H tap) Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
4	Indoor unit forced operation	Allows operation of indoor unit from outdoor unit	○ ● ● ● ○ ○ ●	Indoor unit forced operation Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
5	Frequency fix	Fixes the frequency of the inverter compressor 5HP···68Hz 8.10HP··86Hz+ON	○ ● ● ● ○ ○ ○	Frequency fix Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
6	Te setting	Low pressure setting for cooling	○ ● ● ○ ● ● ●	High Normal (factory set) Low	○ ● ● ● ○ ● ● ○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
7	Tc setting	High pressure setting for heating	○ ● ● ○ ● ● ○		
8	Defrost setting	Temperature setting for defrost	○ ● ● ○ ● ○ ●	Quick defrost Normal (factory set) Slow defrost	○ ● ● ● ○ ● ● ○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
9	Not used	Airnet address	○ ● ● ○ ○ ● ○	Address 0 Binary number 1 (6 digits) 2 〃 63	○ ● ● ● ● ● ● ○ ● ● ● ● ● ○ ○ ● ● ● ● ○ ● 〃 〃 ○ ○ ○ ○ ○ ○ ○

(M029)


No
Setting item
Description
LED display
H1P H2P H3P H4P H5P H6P H7P
1
EMG
Emergency operation when malfunction occurs
Emergency operation
Normal operation
2
Low noise / demand address
Address for low noise / demand group operation
Address
Binary number
(6 digits)
0
1
2
31
Push 3 times
3
Forced fan switch
Fan of stopped indoor unit turns
Forced fan operation (H tap)
Normal operation
4
Indoor unit forced operation
Allows operation of indoor unit from outdoor unit
Forced fan operation (H tap)
Normal operation
5
Frequency fix
Fixes the frequency of the inverter compressor
Frequency fix
Normal operation
6
Te setting
Low pressure setting for cooling
High
Normal (factory set)
Low
7
Tc setting
High pressure setting for heating
8
Defrost setting
Temperature setting for defrost
Quick defrost
Normal (factory set)
Slow defrost
9
Not used
Airnet address
Address
Binary number
(6 digits)
0
1
2
63
Initial setting (EMG)
R
RETURN BUTTON
S
SET BUTTON
(M030)

1.5.3 Monitor Mode


MODE
TEST
HWL
C/H SELECT
IND
MASTER
SLAVE
L.N.O.P.
SEQ. START
H1P
H2P
H3P
H4P
H5P
H6P
H7P
To enter the monitor mode, push the MODE button when in setting mode 1.
MODE
No 0
RETURN
The lower 4 digits indicate the setting in each of the frames below.
Tc (high pressure for heating)
High
Normal (factory set)
Low
Te (low pressure for cooling)
High
Normal (factory set)
Low
SET
Defrost
(temperature setting for defrost)
Quick defrost
Normal (factory set)
Slow defrost
EMG
(emergency operation when malfunction occurs)
ON
OF
SET
No 1
RETURN
Push the SET button and match with the LEDs No. 1 - 15, push the RETURN button, and enter the data for each setting.
* Data such as addresses and number of units is expressed as binary numbers; the two ways of expressing are as follows:
1
16 4 1
32 8 2
The No. 1 cool/heat group address is expressed as a binary number consisting of the lower 6 digits. (0 - 63)
In (1), the address is 010110 (binary number), which translates to 16 + 4 + 2 = 22 (base 10 number). In other words, the address is 22.
SET
(1 to 15 times)
RETURN
No 16
2
64 16
No12 128 32
4 1
No13 8 2
The number of terminal blocks for No. 12 and 13 is expressed as an 8-digit binary number which is the combination of four upper and four lower digits for No. 12 and 13 respectively. (0 - 128)
In (2), the address for No. 12 is 0101, the address for No. 13 is 0110, and the combination of the two is 01010110 (binary number), which translates to 64 + 16 + 4 + 2 = 86 (base 10 number). In other words, the number of terminal blocks is 86.
* See the following page for a list of the data for No. 1 - 16.

(M031)

■ After making sure the data is correct, push the RETURN button and return to No. 0, or push the MODE button and return to setting mode 1.

Monitor Mode Data

Mode No.	LED	Data	Display method	Size (binary number)
No 1	○●●●○●	Low noise / demand address	0 ~ 31	Lower 6 digits
No 2	○●●●○○	Not used		
No 3	○●●●○●●	Not used	0 ~ 63	Lower 6 digits
No 4	○●●●○●○	Number of connected units	0 ~ 63 units	Lower 6 digits
No 5	○●●●○○●	Number of connected HR boxes	0 ~ 63 units	Lower 6 digits
No 6	○●●●○○○	Number of connected zone units (excluding outdoor and HR boxes)	0 ~ 63 units	Lower 6 digits
No 7	○●●○●●●	Number of outdoor units	0 ~ 63 units	Lower 6 digits
No 8	○●●○●●○	Number of HR boxes	0 ~ 128 units	Lower 4 digits, upper
No 9	○●●○●○●	Number of HR boxes	0 ~ 128 units	Lower 4 digits, lower
No 10	○●●○●○○	Number of zone units (excluding outdoor and HR boxes)	0 ~ 63 units	Lower 6 digits
No 11	○●●○○●●	Number of terminal blocks	0 ~ 128 units	Lower 4 digits, upper
No 12	○●●○○●○	Number of terminal blocks	0 ~ 128 units	Lower 4 digits, lower
No 13	○●●○○○●	Not used		
No 14	○●●○○○○	Not used		
No 15	○●○●●●●	Not used		

1.6 Sequential Start

Separates the start timing for standard compressors by three seconds each in order to prevent over-current when several compressors are to be started simultaneously.
Sequential start is possible for up to three units wired as a group to a single power supply. You should however connect an outdoor unit of small capacity as the third unit in the sequence.

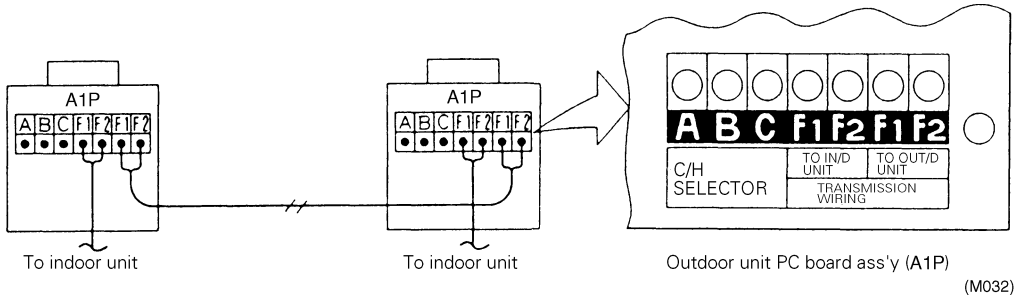
Method of Sequential Start

1. Power supply wiring

Must be wired as a group to the power supply.

2. Wiring

Connect transmission wiring to terminals F1 and F2 (outdoor - outdoor) on the outdoor unit PC board (A1P). Switch to the monitoring mode and see if sequential start has been selected. If not, switch to setting mode 1 and select sequential start. (Sequential start is factory set to “ON.”) For transmission wiring, use 0.75 - 1.25 mm² sheathed vinyl cord or double-core cable.



1.7 BMS Interface Adaptor for Outdoor Unit (MX1R Series)

Purpose / Application

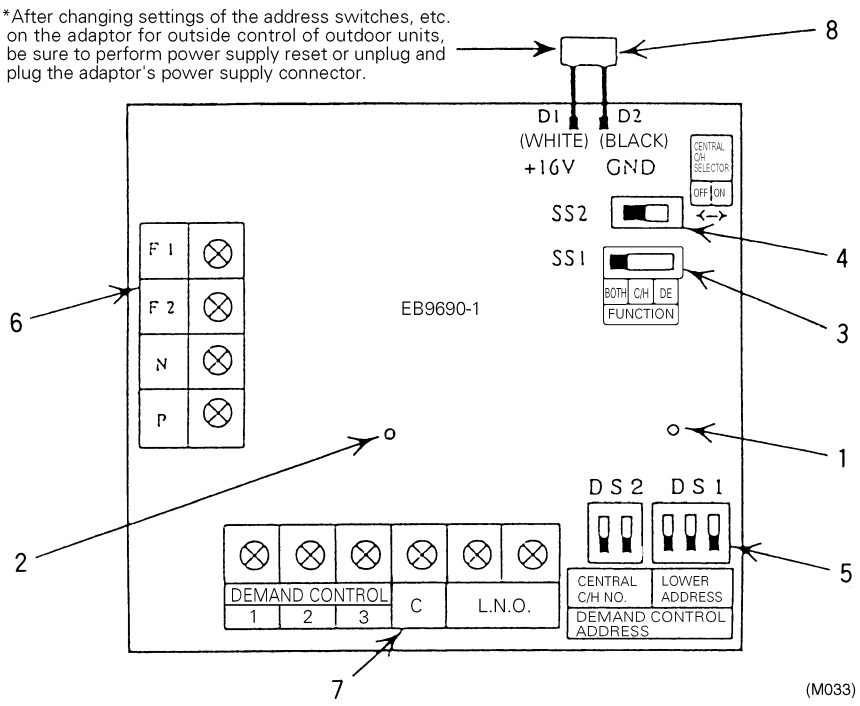
BMS interface adaptor for outdoor unit is required in order for the UM “MX1R Series” to carry out the types of control given below.

1. Group switching of cool/heat mode for more than one outdoor unit system. The adaptor is required for cool/heat selection by indoor unit remote controller, by cool/heat selector, or by cool/heat central remote controller.
2. Low noise control
3. Demand control

Installation Position

The adaptor can be installed inside any indoor unit or HR box connected to a UM net.

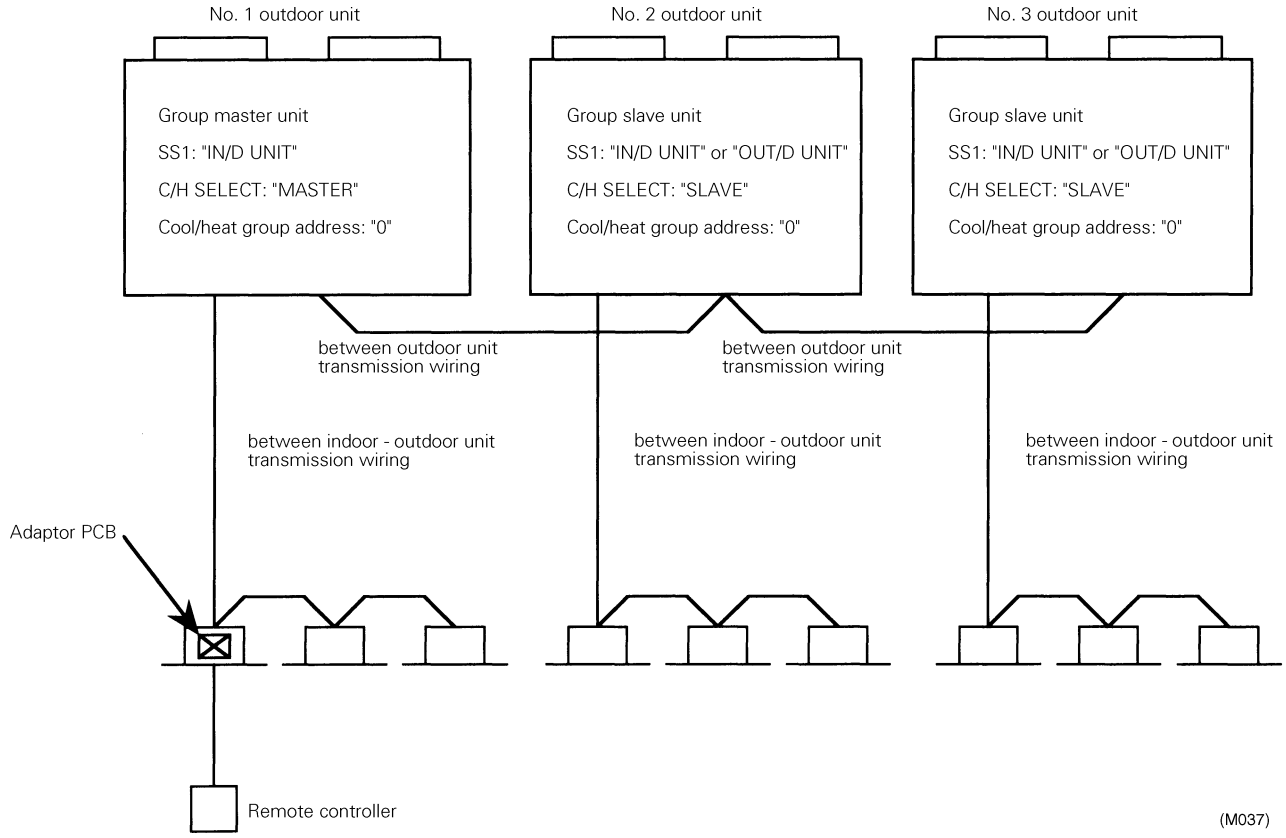
Part Names and Functions



1	SERVICE MONITOR [HAP] (Green)	Normal: Flicker Malfunction: On or off	LED display ○ : On ◑ : Flicker ● : Off
2	SERVICE MONITOR [H01P] (Green)	When using cool/heat central remote controller: Normal: On Malfunction: Off (If not using cool/heat central remote controller, LED remains off.	
3	Function switch [SS1] (Factory set: BOTH)	Sets whether the address setting switch will set cool/heat address, demand / low noise address, or both. Left (BOTH) Middle (C / H) Right (DE·LOW NOISE) (M034)	
4	Cool/heat central remote controller selection switch [SS2] (Factory set: No)	Sets whether cool/heat central remote controller is connected or not. Left (Not connected) Right (Connected) (M035)	
5	Address setting switch [DS2 / DS1] (Factory set: 0)	Sets cool/heat address or demand address.	Upper 2 bits (ON) (1) Lower 3 bits (OFF) (0) (M036) (The black part represents the switch.)
6	Terminal block for transmission (F1 / F2) (N / P)	F1 / F2 : Wiring connection with terminals F1 and F2 of outdoor unit, etc. N / P : Wiring connection with terminals N and P of cool/heat central remote controller.	
7	Demand / low noise input terminal block (X1M)	Connects control input from remote source (host computer monitor panel, demand controller, timer, etc.).	
8	Power supply connector (D1 / D2)	Connects “power supply connector for adaptor for outside control of outdoor units” of indoor unit or HR box, etc.	

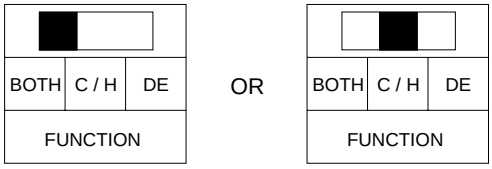
System Examples

Group selection of cool/heat mode by indoor unit remote controller


No. 1 outdoor unit
No. 2 outdoor unit
No. 3 outdoor unit
Group master unit
SS1: "IN/D UNIT"
C/H SELECT: "MASTER"
Cool/heat group address: "0"
Group slave unit
SS1: "IN/D UNIT" or "OUT/D UNIT"
C/H SELECT: "SLAVE"
Cool/heat group address: "0"
Group slave unit
SS1: "IN/D UNIT" or "OUT/D UNIT"
C/H SELECT: "SLAVE"
Cool/heat group address: "0"
between outdoor unit transmission wiring
between outdoor unit transmission wiring
between indoor - outdoor unit transmission wiring
between indoor - outdoor unit transmission wiring
between indoor - outdoor unit transmission wiring
Adaptor PCB
Remote controller
(M037)

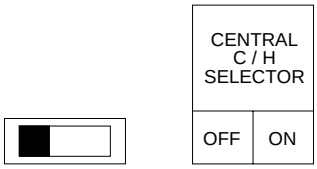
Switch Settings on the Adaptor PCB

■ SS1



(M038)

■ SS2



(M039)

■ DS1 / DS2

Address "0"

(M040)

Outdoor Unit PCB Settings

■ Group master unit
SS1: “IN/D UNIT”
Setting mode 1
C / H SELECT : “MASTER”
Setting mode 2
Cool/heat group address: “0”
Combines DS1 and DS2 of PC board adaptor.

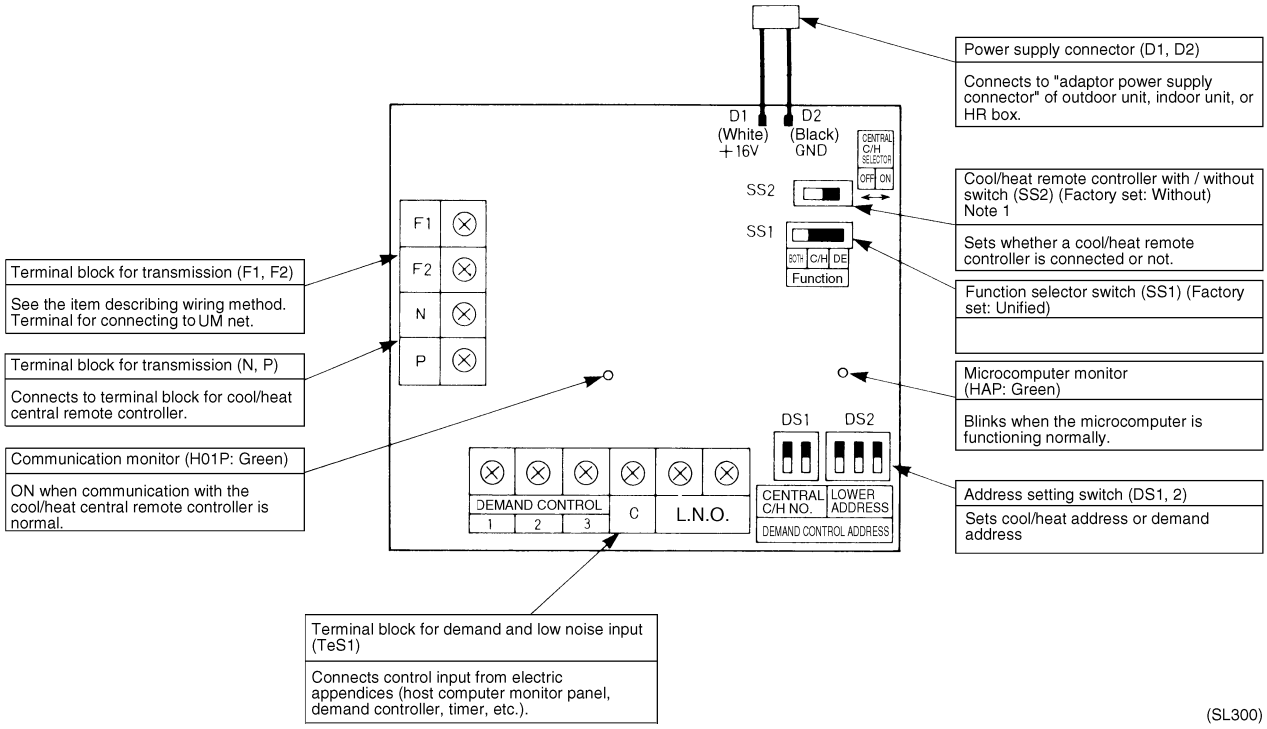
■ Group slave unit
SS1: “IN/D UNIT” or “OUT/D UNIT”
Setting mode 1
C / H SELECT : “SLAVE”
Setting mode 2
Cool/heat group address: “0”
Combines DS1 and DS2 of adaptor PCB.

1.8 BMS Interface Adaptor for Outdoor Unit (ME1R Series)

<Objective/use>

By adding an BMS interface adaptor for outdoor unit to HR boxes or indoor units connected in a UM net, you can simultaneously select cool/heat mode for several outdoor units in the system, and it enables demand control and low noise control.

Part Names and Functions

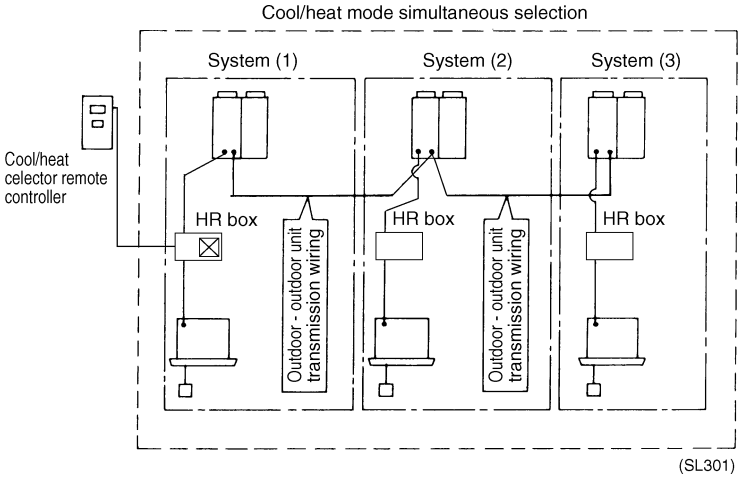

Power supply connector (D1, D2)
Connects to "adaptor power supply connector" of outdoor unit, indoor unit, or HR box.
D1 (White) +16V
D2 (Black) GND
CENTRAL C/H SELECTOR
OFF ON
SS2
Cool/heat remote controller with / without switch (SS2) (Factory set: Without) Note 1
SS1
Sets whether a cool/heat remote controller is connected or not.
BOTH C/H DE
Function
Function selector switch (SS1) (Factory set: Unified)
Terminal block for transmission (F1, F2)
See the item describing wiring method. Terminal for connecting to UM net.
F1
F2
N
P
Terminal block for transmission (N, P)
Connects to terminal block for cool/heat central remote controller.
Communication monitor (H01P: Green)
ON when communication with the cool/heat central remote controller is normal.
Microcomputer monitor (HAP: Green)
Blinks when the microcomputer is functioning normally.
DS1
DS2
DEMAND CONTROL
1
2
3
C
L.N.O.
CENTRAL C/H NO.
LOWER ADDRESS
DEMAND CONTROL ADDRESS
Address setting switch (DS1, 2)
Sets cool/heat address or demand address
Terminal block for demand and low noise input (TeS1)
Connects control input from electric appendices (host computer monitor panel, demand controller, timer, etc.).
(SL300)

Note: 1. SS2 is not applicable to cooling only system.

1.8.1 Cool/Heat Mode Unified Selection

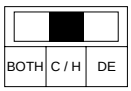
(For detailed example of wiring, see the page describing cool/heat mode control.)

<System outline>



<Settings of switches on the PC board adaptor>

■SS1



C / H

(SL302)

("BOTH" is selected when demand control is carried out at the same time.)

■SS2

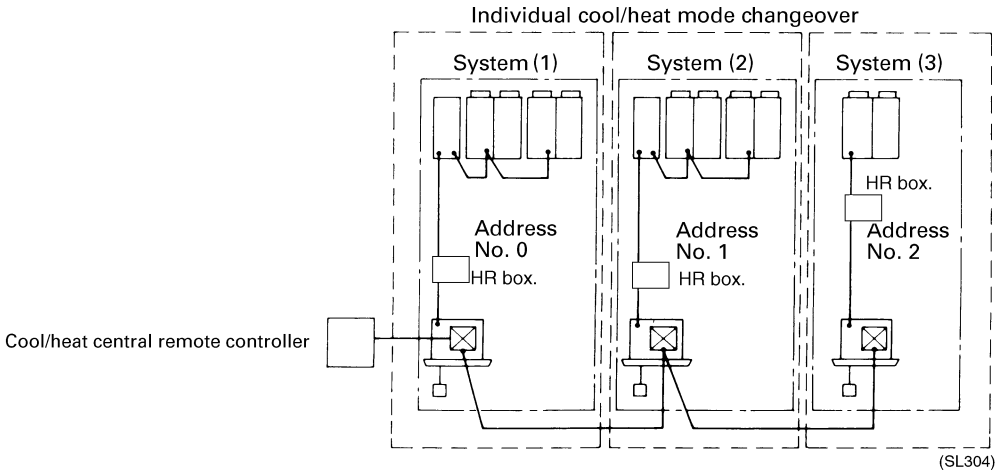
OFF

(SL303)

■DS1·2

BMS interface adaptor for outdoor unit

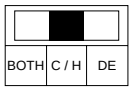
<Changeover by cool/heat central remote controller>



(SL304)

<Switch settings on adaptor printed circuit board>

■SS1



Cool

(SL305)

(When demand control is used together, set the switch to "BOTH")

■SS2

ON

(SL306)

■DS1·2 For individual control, do not use the same address twice.

1.8.2 Demand / Low Noise Control

Connecting control input to the BMS interface adaptor for outdoor unit enables demand and low noise control.

■ **Demand control (figures indicate demand rate)**

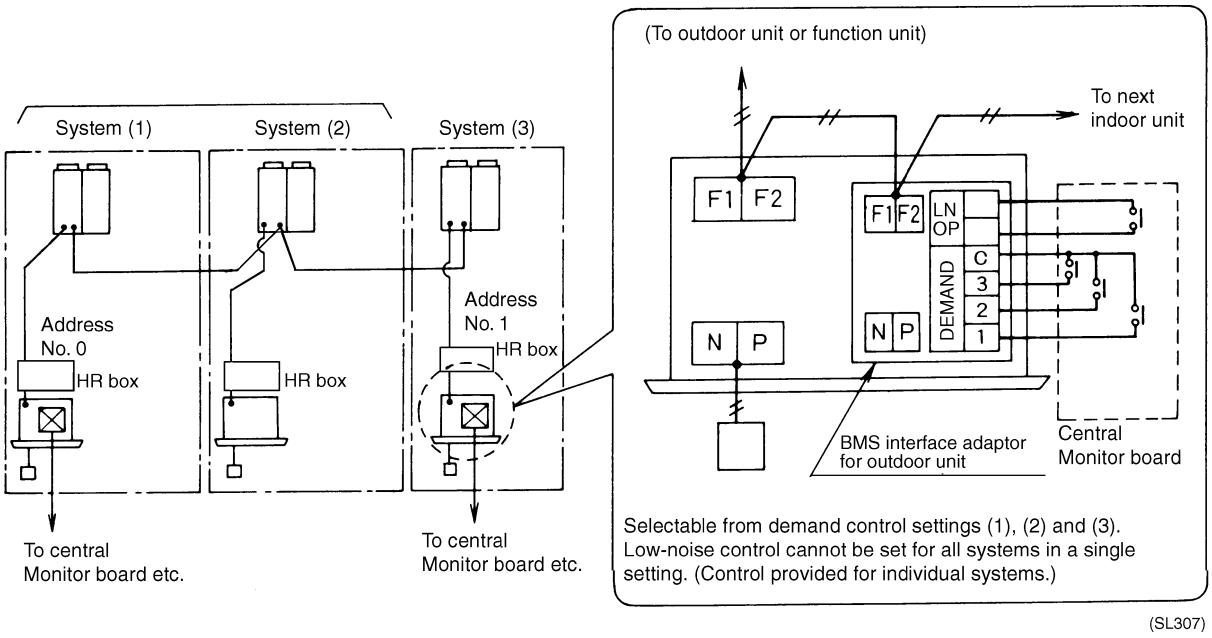
When short circuit between (1) and (C): Approx. 70% as a guideline
When short circuit between (2) and (C): Approx. 40% as a guideline
When short circuit between (3) and (C): Forced fan operation

■ **Low noise control (Outdoor unit)**

Running noise can be reduced by 2~ 3dB by controlling capacity of outdoor unit.

<System general>

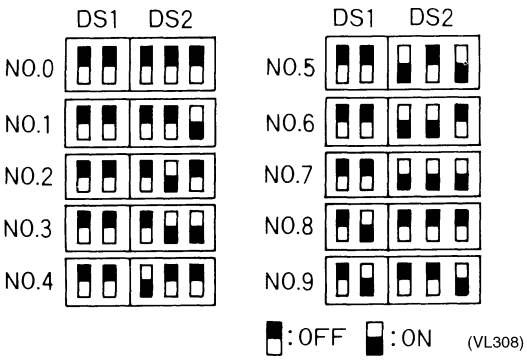
When each system is set to the same address, the same demand control operation is conducted.



<Common>

<Address setting (DS1 / DS2)>

Decide the address for each control unit from 0~9 and set.



Notes:

- Setting is within 8 groups when using a cool/heat central remote controller. Set from No. 0~No. 7.
- Be sure to make the address No. of the PC board adaptor described above match the address No. of function unit or outdoor unit (HR box if using cool/heat simultaneous selection type). (For detailed settings, see the installation instruction.)

<Control input specifications>

- **Input signal**

  Constant contact a

  Input current is approx. 12 - 24 VDC, 10 mA per contact.

  Use a micro-current contact for the relay contact.

  (Max. 12 VDC, 1 mA)

- **Outside wiring specifications**

  Recommended electric wiring: Sheathed vinyl cord or cable 0.75~1.25 mm² (double core)

  Wiring length: Max. 150 m

  Run separate from power line in order to prevent malfunction.

- **Installation positions**

	Model/series	Installation box/plate	Installation position
Outdoor unit	Function unit	Not necessary	Inside main unit's electric box
Indoor unit	CS-UM	KRP1B98	∗ Regarding installation position, see the page describing the remote group control adaptor
	CS-LM	KRP1B96	
	CS-DM CS-FM CS-EM	Not necessary	
	CS-TM	KRP1B93	
	CS-KM	Not necessary	
	CS-PM/CS-RM		
	CZ-HR	Not necessary	Inside main unit's electric box

1.9 Cool / Heat Mode Selection (MX1R Series)

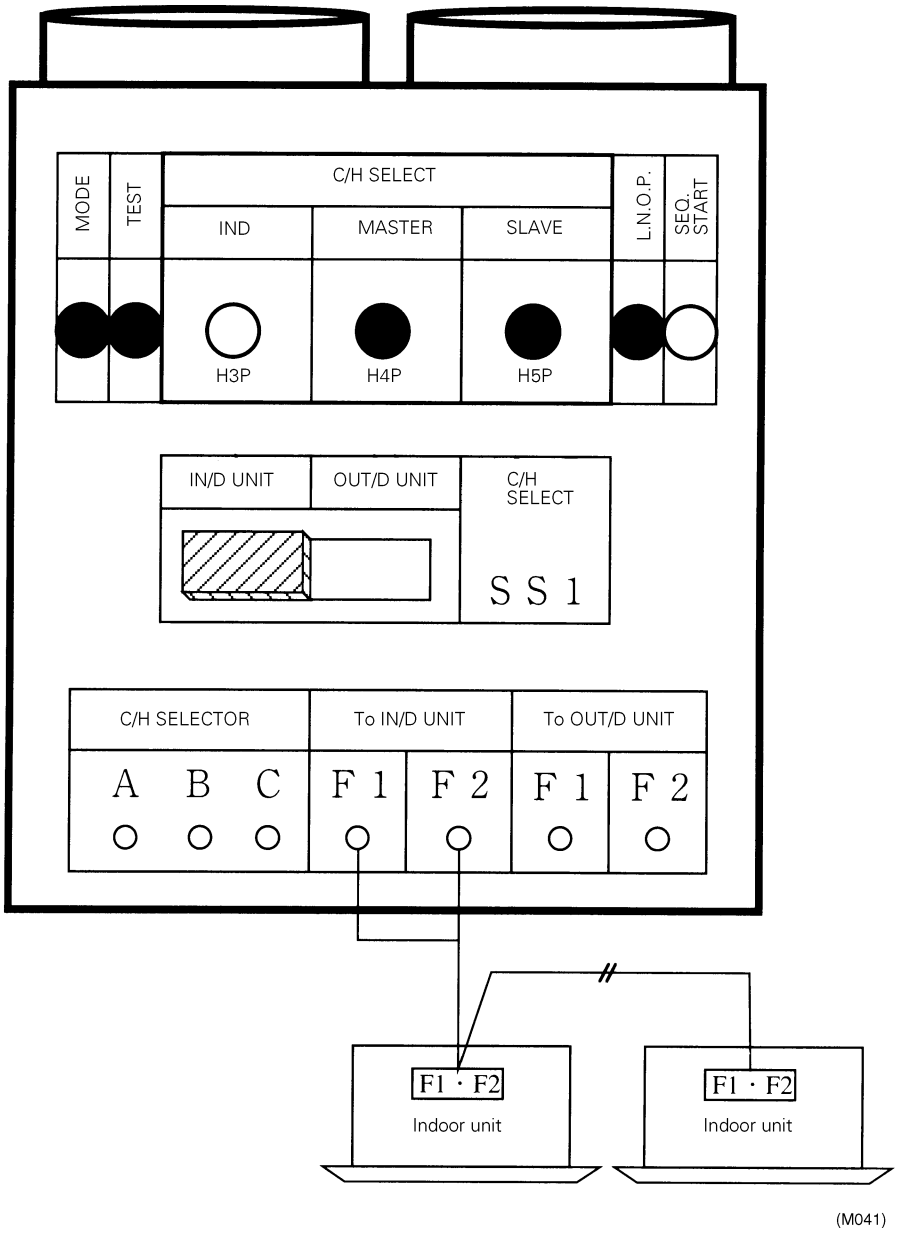
The UM “MX1R Series” offers the following four cool/heat mode selections.

1. Setting of cool/heat by individual outdoor unit system by indoor unit remote controller
2. Setting of cool/heat by individual outdoor unit system by cool/heat selector
3. Setting of cool/heat by outdoor unit system group in accordance with group master outdoor unit by indoor unit remote controller
4. Setting of cool/heat by outdoor unit system group in accordance with group master outdoor unit by cool/heat selector

Each of these setting methods is explained in detail below.
(For **3** and **4** be sure to perform power supply reset after changing settings.)

1.9.1 Setting of Cool / Heat by Individual Outdoor Unit System by Indoor Unit Remote Controller

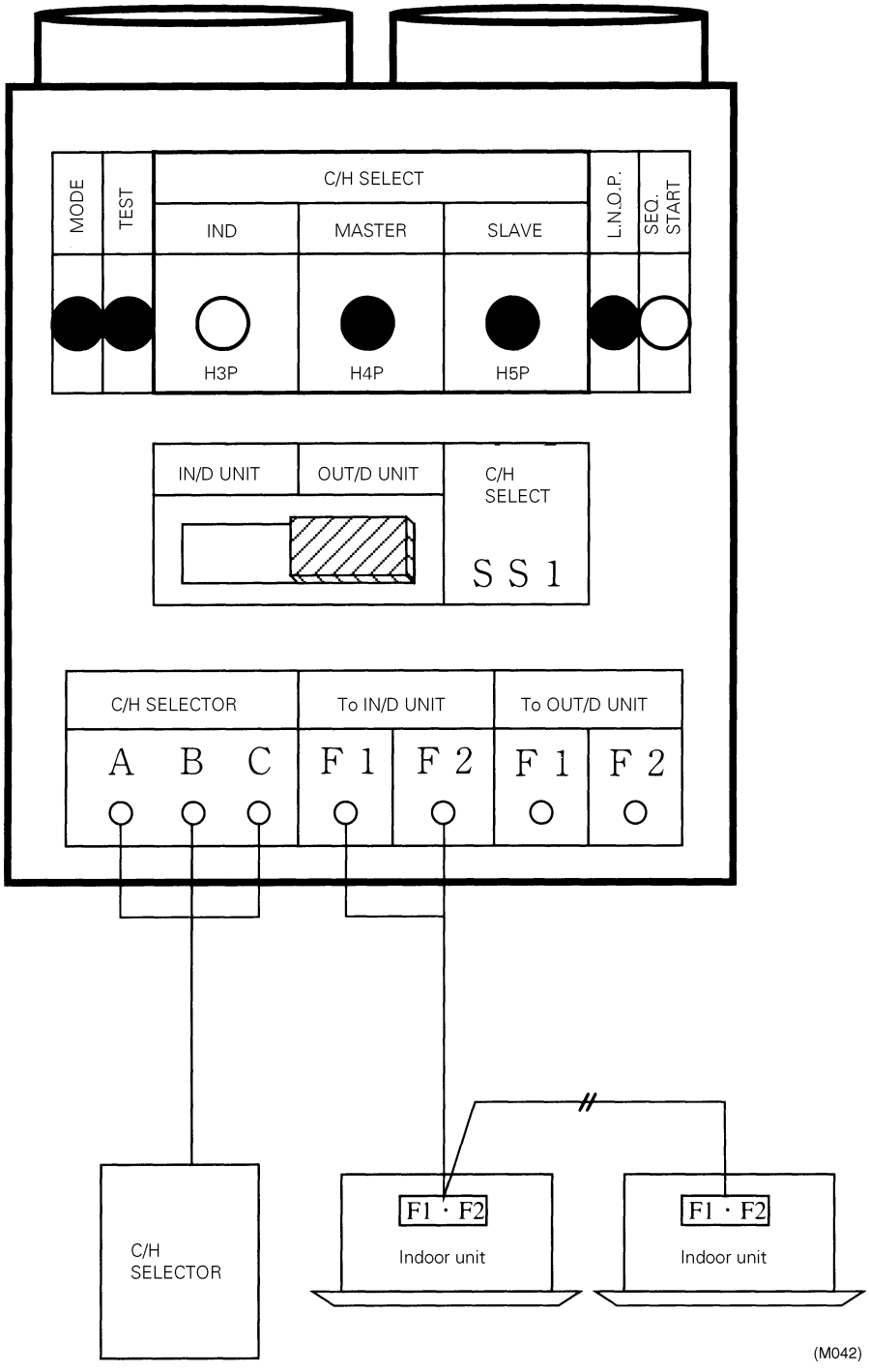
- Doesn’t matter whether or not there is outdoor - outdoor unit wiring.
- Set SS1 of the outdoor unit PCB to “IN / D UNIT” (factory set).
- In setting mode 1, set cool/heat selection to “IND” (factory set).



(M041)

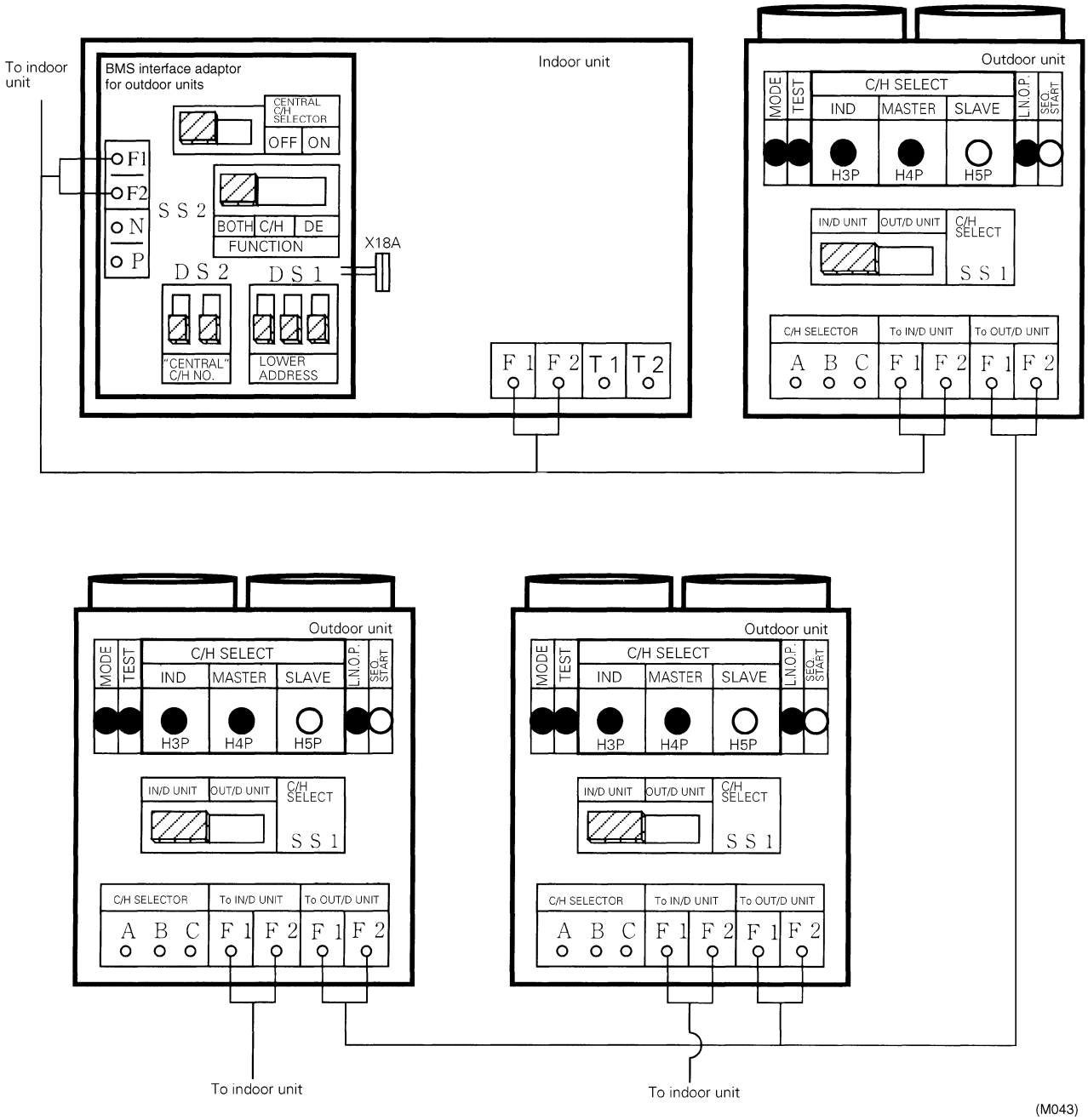
1.9.2 Setting of Cool / Heat by Individual Outdoor Unit System by Cool/Heat Selector

- Doesn't matter whether or not there is outdoor - outdoor unit wiring.
- Set SS1 of the outdoor unit PC board to "OUT / D UNIT."
- In setting mode 1, set cool/heat selection to "IND" (factory set).



1.9.3 Setting of Cool / Heat by Outdoor Unit System Group in Accordance with Group Master Outdoor Unit by Indoor Unit Remote Controller

- Install the BMS interface adaptor for outdoor unit on either the outdoor - outdoor, indoor - outdoor, or indoor - indoor transmission line.
- Set SS1 of the outdoor unit PCB to “IN / D UNIT” (factory set).
- In setting mode 1, set the outdoor unit you want to give cool/heat selection permission to as the group master, and set the other outdoor units as group slave units.
- Set SS1 of the BMS interface adaptor for outdoor unit to “BOTH” (factory set) or “C / H.” Set SS2 to “OFF” (factory set).



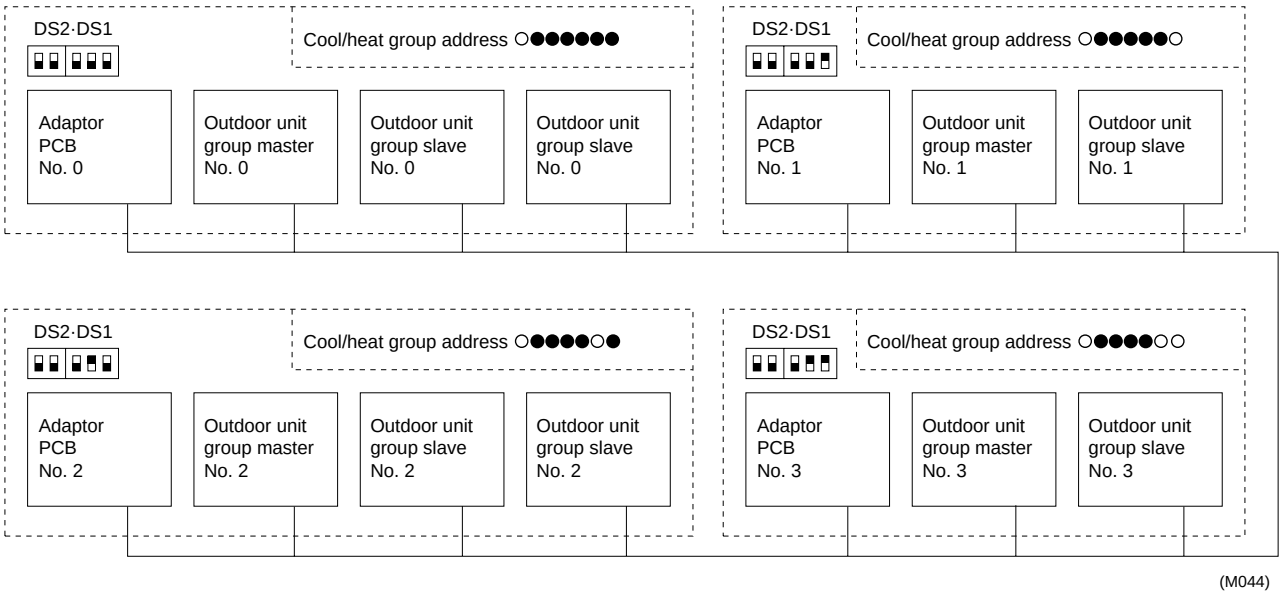
1.9.4 Setting of Cool / Heat by Outdoor Unit System Group in Accordance with Group Master Outdoor Unit by Cool/Heat Selector

- In addition to **1.9.3**, change the following:
- Install a cool / heat selector to the group master outdoor unit.
- Set SS1 of the group master outdoor unit’s PCB to “OUT / D UNIT.”

Supplement

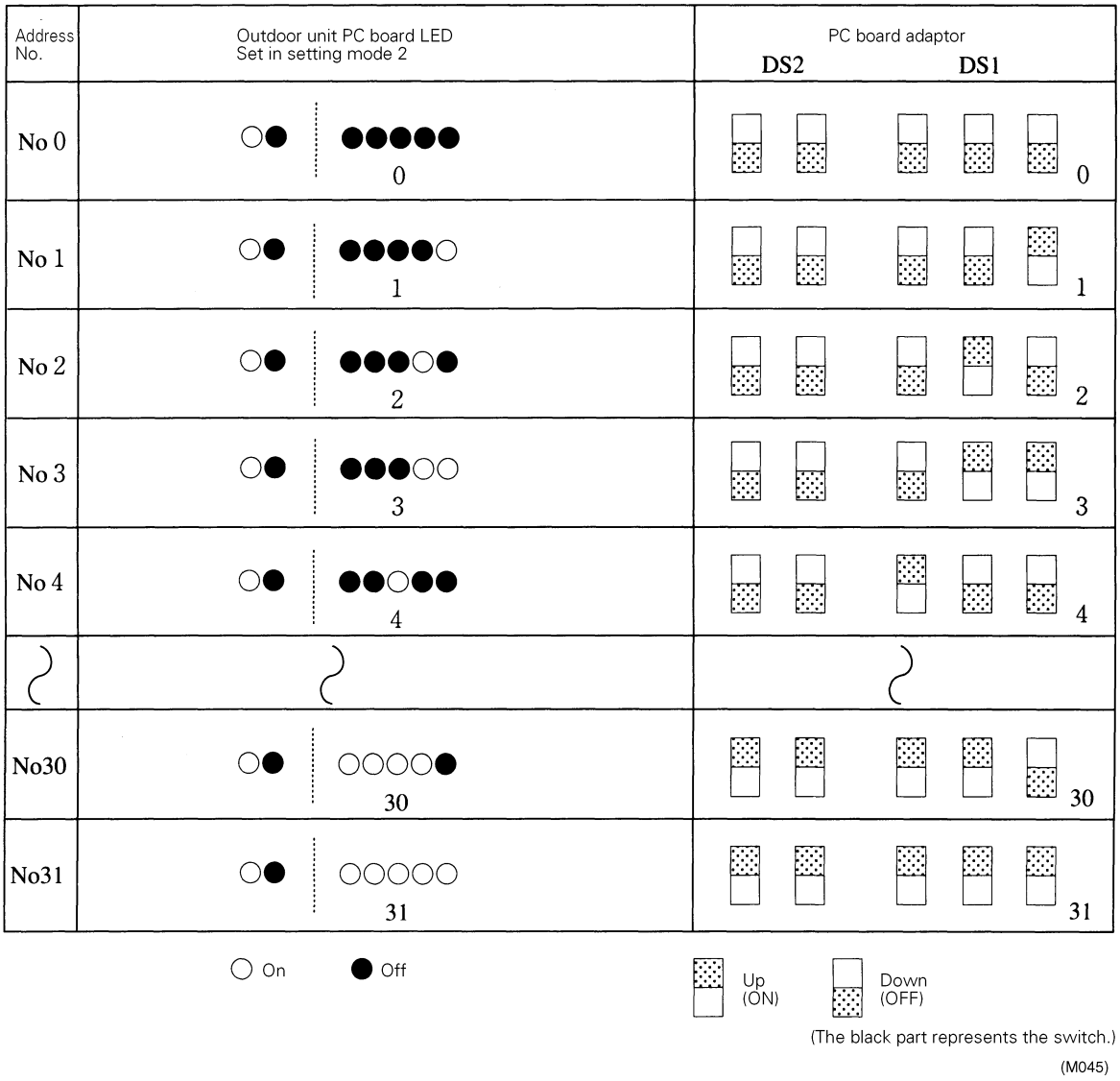
■ Supplement to **1.9.3** and **1.9.4**

If using several adaptor PCB and you want to select cool/heat mode for each adaptor PCB, set DS1 / DS2 of the adaptor PCB and the cool/heat group address on the outside unit's PCB to the same setting in setting mode 2.


DS2·DS1
Cool/heat group address ○●●●●●●
Adaptor PCB No. 0
Outdoor unit group master No. 0
Outdoor unit group slave No. 0
Outdoor unit group slave No. 0
DS2·DS1
Cool/heat group address ○●●●●●○
Adaptor PCB No. 1
Outdoor unit group master No. 1
Outdoor unit group slave No. 1
DS2·DS1
Cool/heat group address ○●●●●○●
Adaptor PCB No. 2
Outdoor unit group master No. 2
Outdoor unit group slave No. 2
Outdoor unit group slave No. 2
DS2·DS1
Cool/heat group address ○●●●●○○
Adaptor PCB No. 3
Outdoor unit group master No. 3
Outdoor unit group slave No. 3

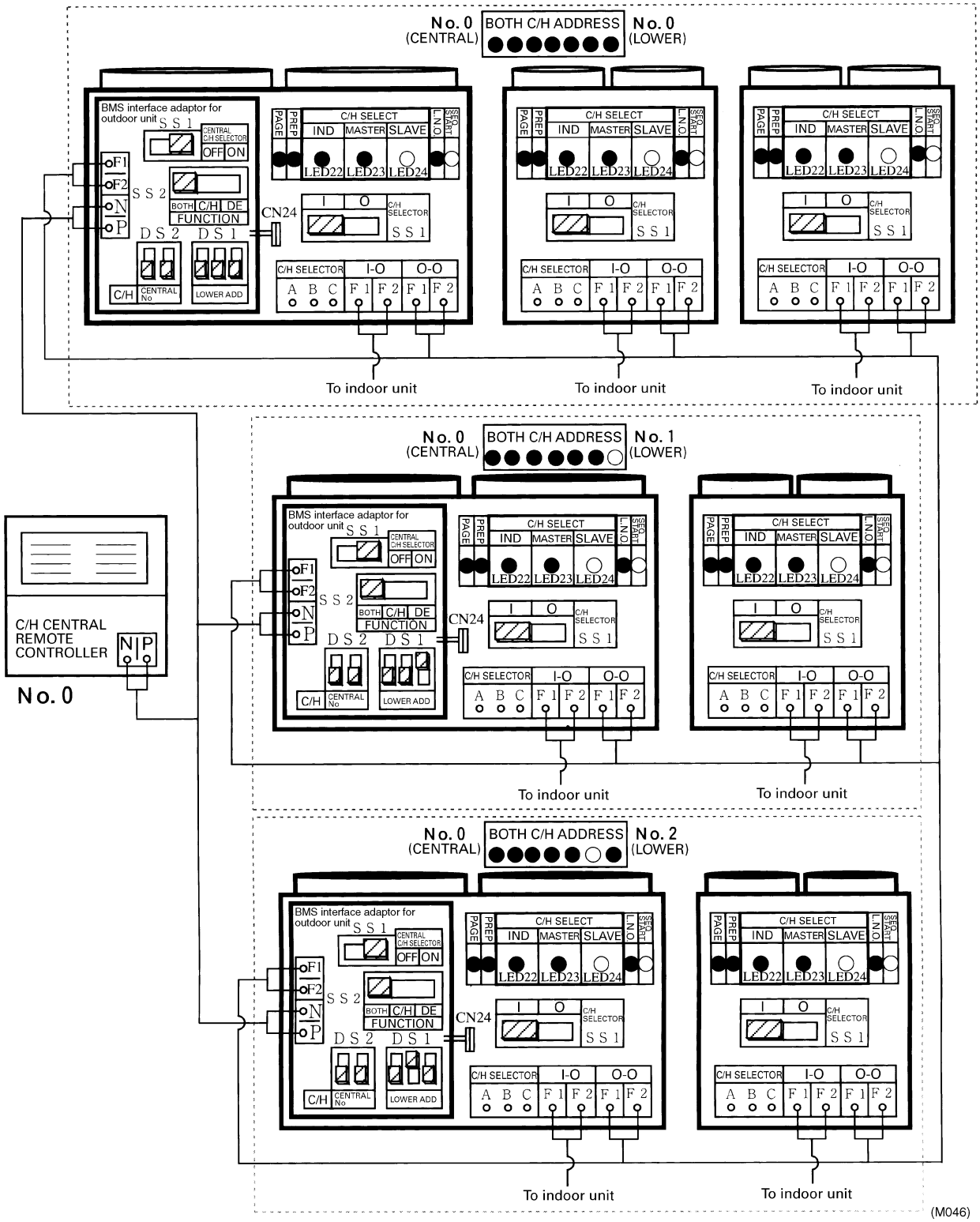
(M044)

Setting Method **1.9.3** and **1.9.4** address setting method (combine lower 5 digits as binary number)

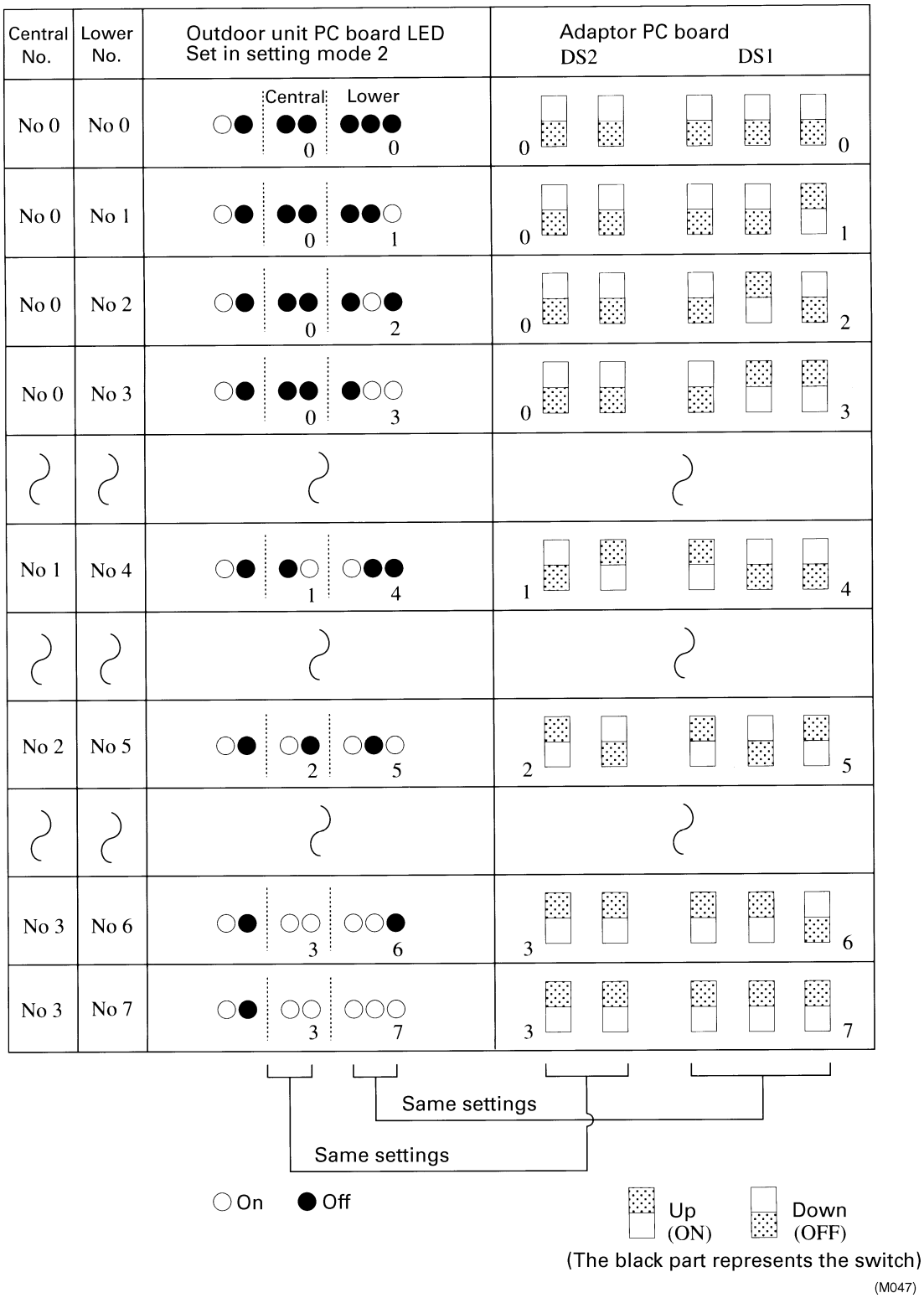


1.9.5 Setting cool/heat for outdoor units of all BMS interface adaptors for outdoor unit using the cool/heat central remote controller

- Install the BMS interface adaptor for outdoor unit in the outdoor-to-outdoor, indoor-to-outdoor or indoor-to-indoor signal transmission line.
- In setting mode 1, set all outdoor units as slaves.
- Set the SS1 on the outdoor unit external control adaptor to Both (factory setting) or Cool, and the SS2 to ON.
- In setting mode 2, set the DS1 and DS2 on the BMS interface adaptor for outdoor unit and so that they match the cool/heat unified addresses on the outdoor unit's printed circuit board. (Addresses are set to "0" at the factory.)



Address settings to be made in step 1.9.5 (set two middle digits and three lower digits based on binary system) [No. 0 · 0 ~ 3 · 7]

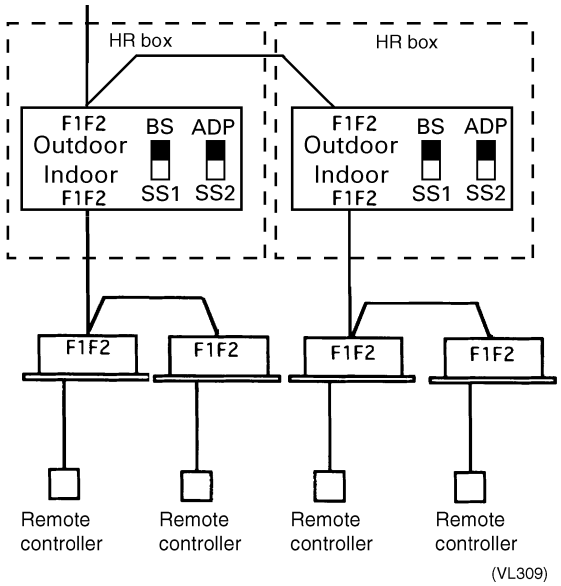


1.10 Cool / Heat Mode Switching (ME1R Series)

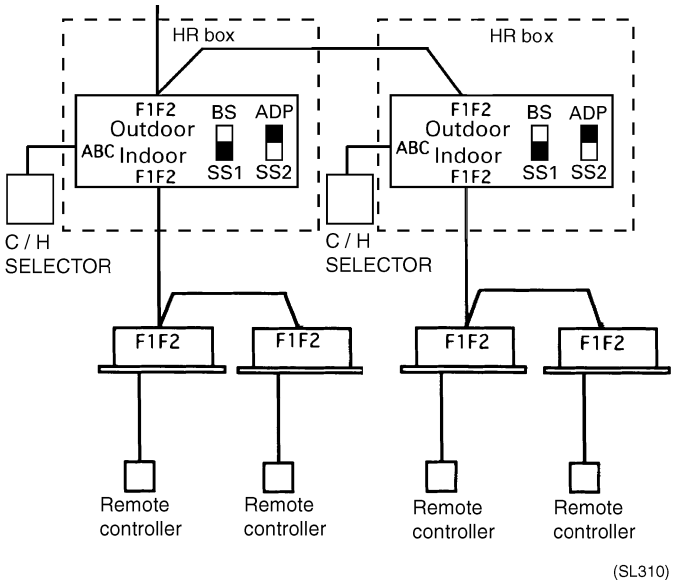
The UM “ME1R Series” offers the following 3 cool/heat modes.

1. Set cool/heat individually for all HR box systems using the indoor unit remote controller.
2. Set cool/heat individually for all HR box systems using the cool/heat select remote controller.
3. Set cool/heat individually for all HR box systems using the cool/heat central remote controller.

1.10.1 Set cool/heat individually for all HR box systems using the indoor unit remote controller.

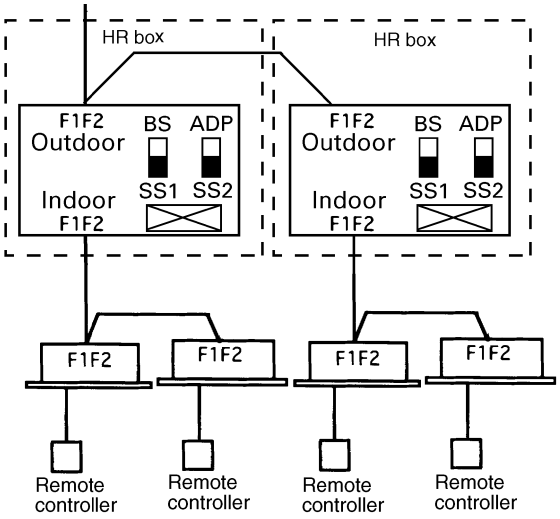


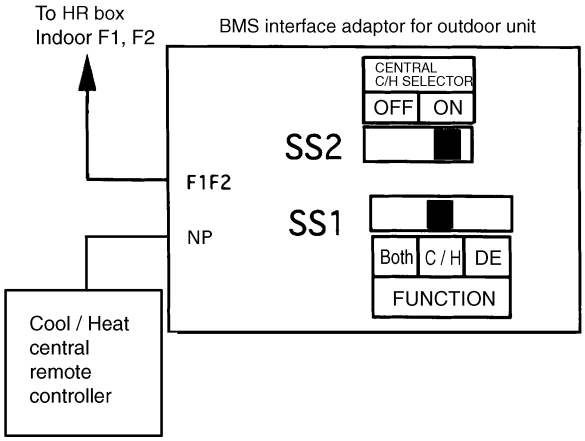
1.10.2 Set cool/heat individually for all HR box systems using the cool/heat select remote controller.



1.10.3 Set cool/heat individually for all HR box systems using the cool/heat central remote controller.

■ Install the "BMS interface adaptor for outdoor unit" in HR box.





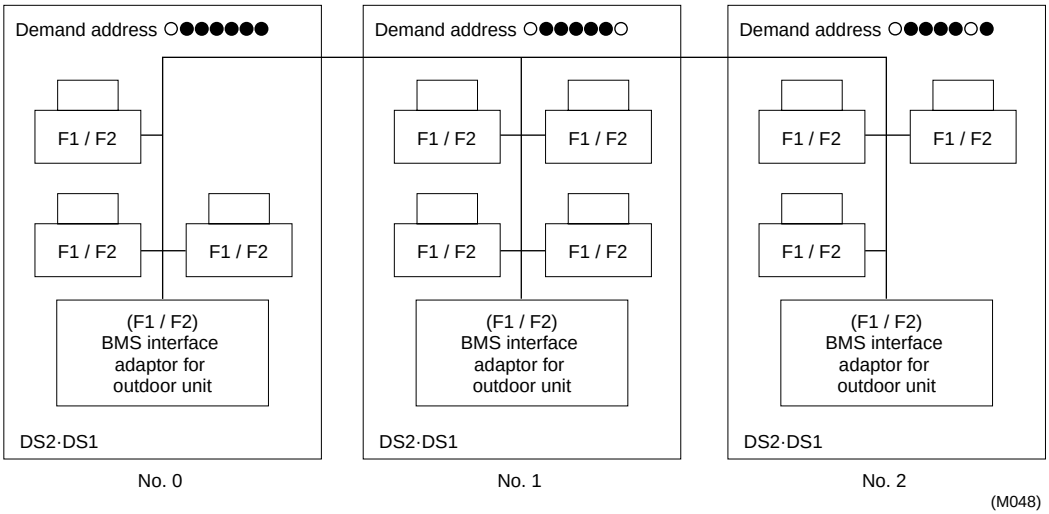
· DS 1 · DS 2 : Address setting
Address setting is not necessary

(SL311)

1.11 Low Noise / Demand Operation (MX1R Series)

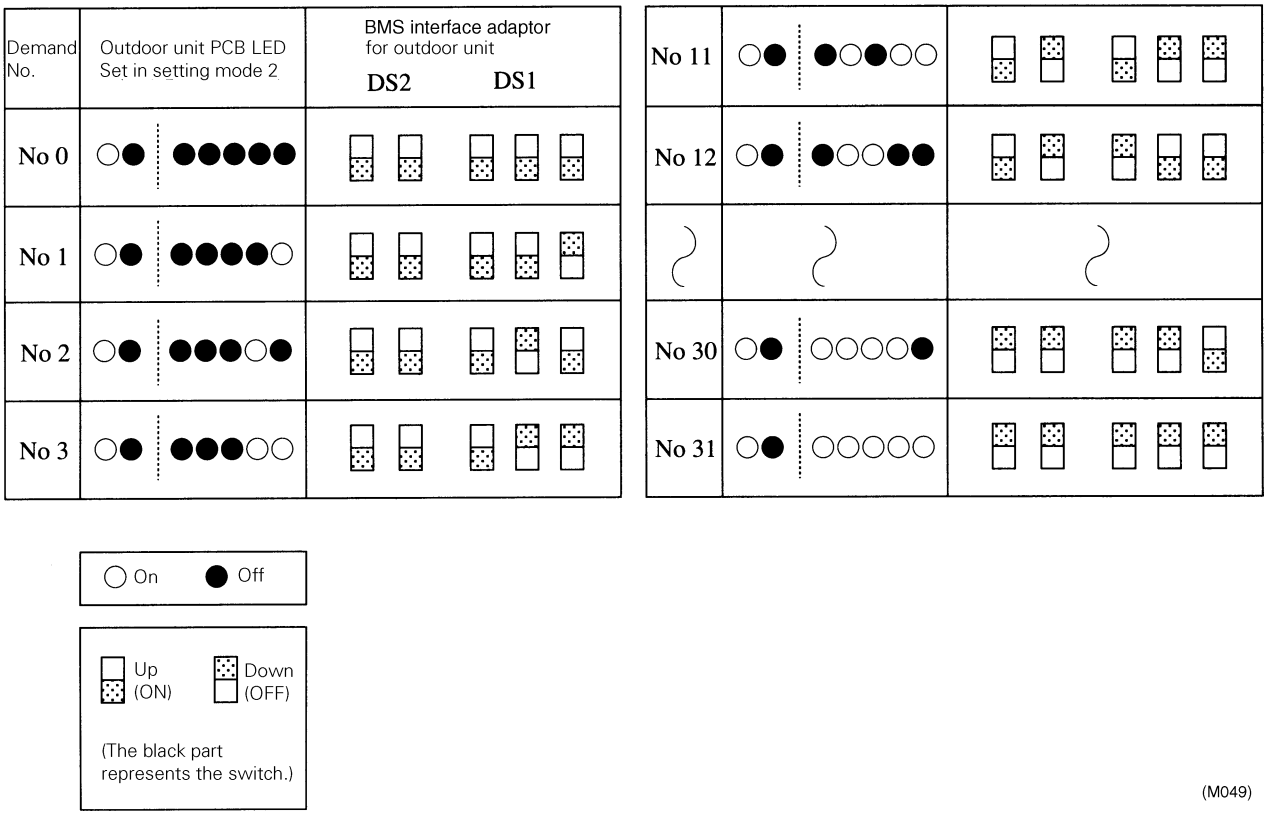
BMS interface adaptor for outdoor unit is required for each low noise and demand control zone.

- By using a separate BMS interface adaptor for outdoor unit and setting the outdoor unit address (setting mode 2) for each low noise and demand control zone, demand and low noise operation is carried out in accordance with contact input received from the adaptor in each zone.



(M048)

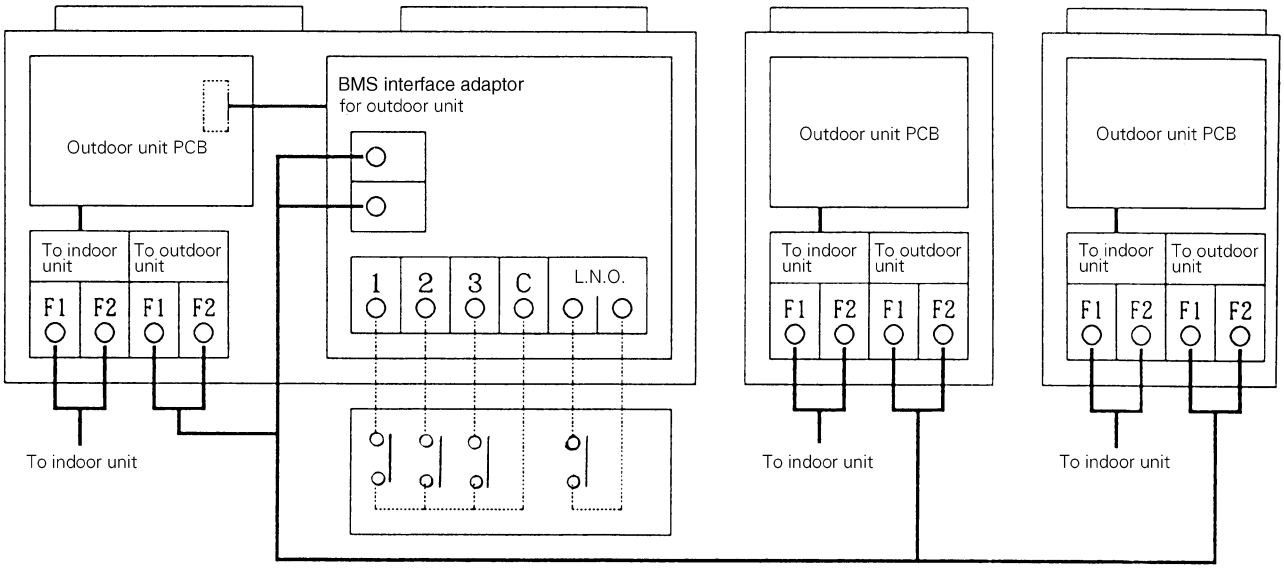
- Outdoor unit address setting (Setting mode 2; see page 283.)
- BMS interface adaptor for outdoor unit address setting
  - Decide and set demand address 0 - 31 for each demand and low noise control zone. (See fig. below.)
  - Set SS1 to “BOTH” (factory set) or “C / H.”



(M049)

Wiring Method

Wire to the control box for the indoor unit or HR box. (Note: Differs according to the type of outside control adaptor.)



(M050)

Demand / Low Noise Input

Short circuit between Demand 1 and C: Holds demand down to approx. 70%
Short circuit between Demand 2 and C: Holds demand down to approx. 40%
Short circuit between Demand 3 and C: Forced OFF by thermostat
L.N.O (jumper): Carries out low noise operation.

Input Signal

Input current by constant contact is about 10 mA per contact. Use a micro-current contact for the relay contact.

Exterior wiring specifications for demand and low noise operation
Recommended wiring:Sheathed vinyl cord or cable
Wiring length: 150 m
Keep away from power line in order to prevent malfunction.

1.12 Low Noise Operation (ME1R Series)

By connecting the external contact input to the low noise input of the BMS interface adaptor for outdoor unit (optional), you can save power and lower operating noise by 2 -3 dB.

1. Outdoor unit field setting

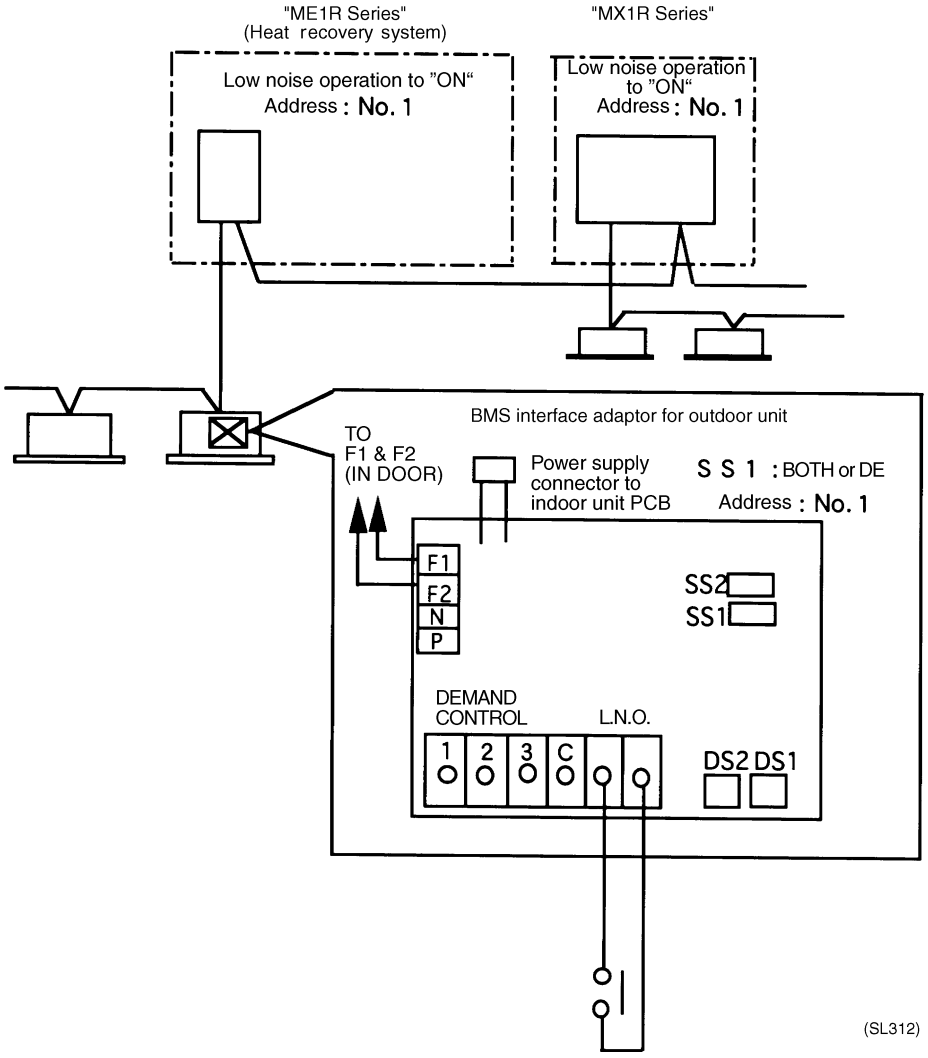
- Setting mode 1: Set low noise operation to “ON”.
- Setting mode 2: Match low noise operation and demand control address with address of BMS interface adaptor for outdoor unit.

2. BMS interface adaptor for outdoor unit setting

- Function switch (SS1)
  Set to “BOTH” or “DE.”
- Address setting switches (DS1, DS2)
  Match with outdoor unit low noise operation and demand control address.

3. Short-circuit the low noise input of BMS interface adaptor for outdoor unit.

Low Noise Control System Example



1.13 Demand Control (ME1R Series)

By connecting the external contact input to the demand input of the BMS interface adaptor for outdoor unit (option), the compressor operating conditions can be controlled for reduced power consumption.

1. Demand 1 Approximately 70% level
2. Demand 2 Approximately 40% level
3. Demand 3 Forced thermostat OFF

1.13.1 Instructions for demand control operation

1. Outdoor unit field setting

■ Setting mode 1: Set low noise operation to “ON”.
Match low noise operation and demand control address with address of BMS interface adaptor for outdoor unit.

2. BMS interface adaptor for outdoor unit setting

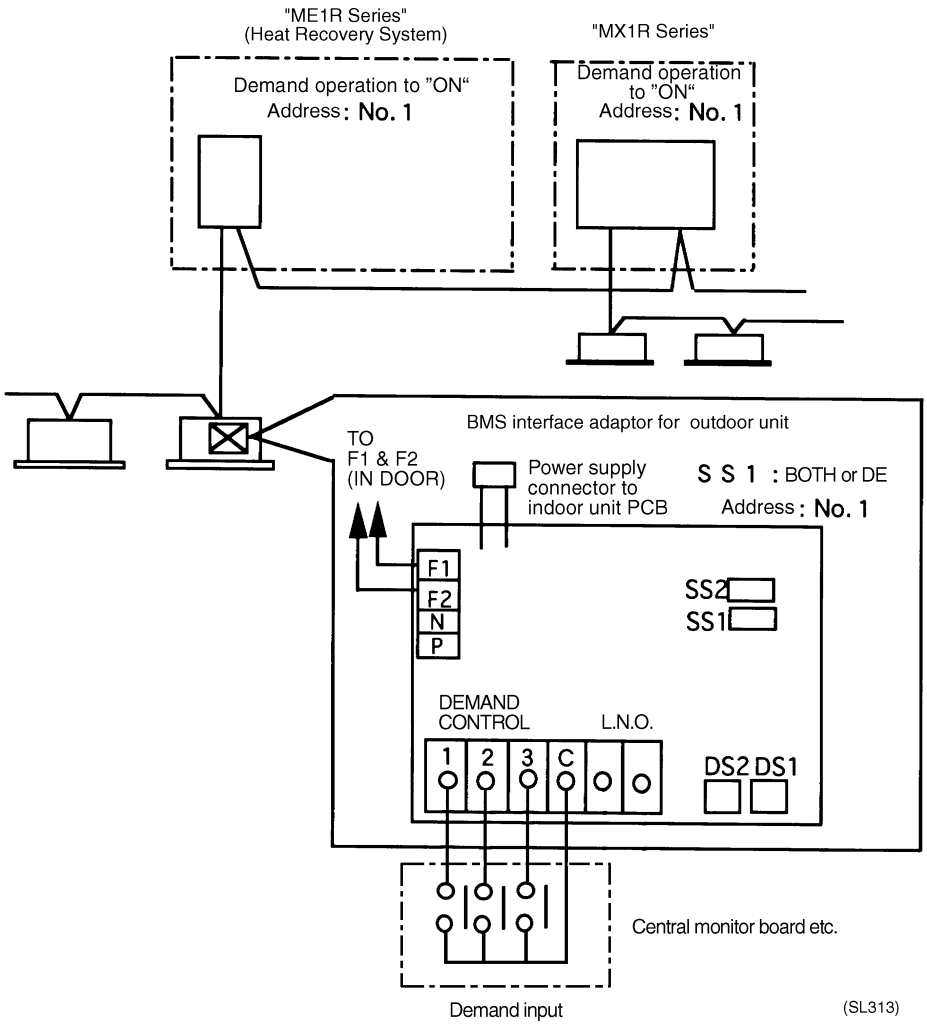
■ Function switch (SS1)
Set to “BOTH” or “DE.”

■ Address setting switches (DS1, DS2)
Match with outdoor unit low noise operation and demand control address.

3. Select one from demand input terminals 1 through 3 on the BMS interface adaptor for outdoor unit, and short the corresponding terminals.

1. Demand 1 Short 1-C.
2. Demand 2 Short 2-C.
3. Demand 3 Short 3-C.

Demand Control System Example

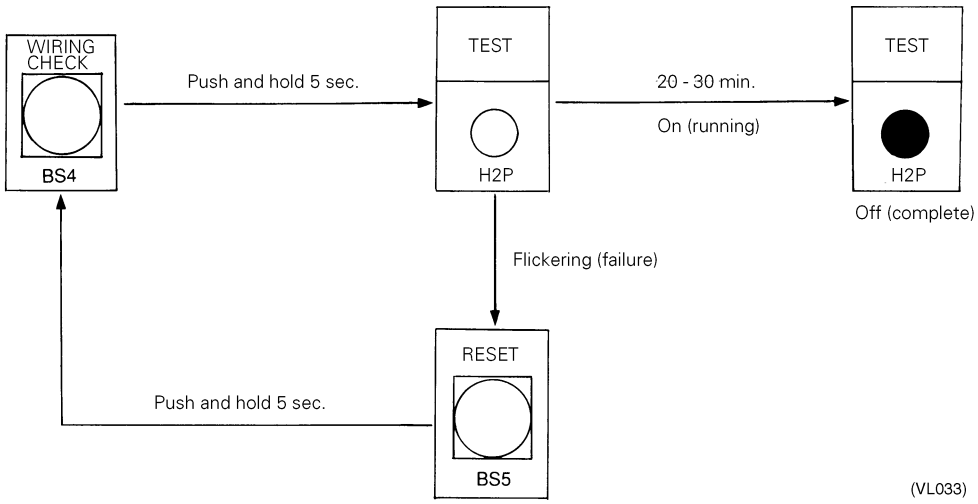


1.14 Wiring Check Operation

If within 12 hours of stopping cooling or heating, be sure to run all indoor units in the system you want to check in the fan mode for about 60 minutes in order to prevent mis-detection.

Operation Method

1. In the monitor mode, check the number of connected indoor units. (See monitor mode.)
2. Push and hold the WIRING CHECK button (BS4) for 5 seconds to perform wiring check operation. While running, TEST (H2P) lights and goes off when finished.
   If TEST (H2P) flickers (wiring check operation failure), push and hold the RESET button (BS5) for 5 seconds, and then repeat the procedure from the beginning.
3. About 1 minute after you finish running the system, once again check the number of connected indoor units in the monitor mode and make sure the number agrees with the first time you checked. If not, it indicates that there is a wiring mistake. Fix the wiring of the indoor unit whose remote controller displays “UF” when its ON/OFF switch is turned ON.



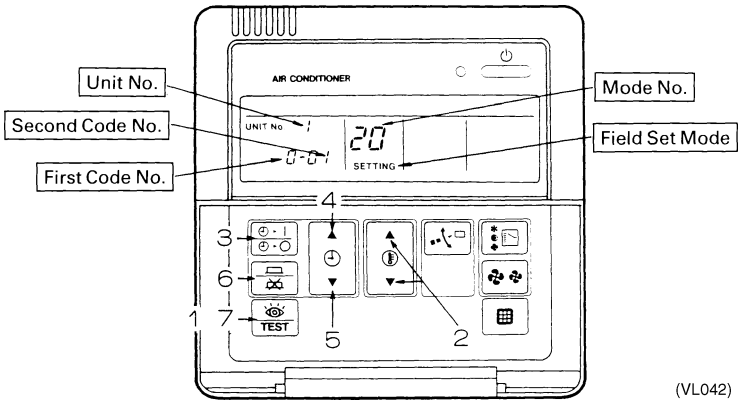
Note: Other settings are not accepted during wiring check operation.

1.15 Indoor Field Setting

Making a field setting

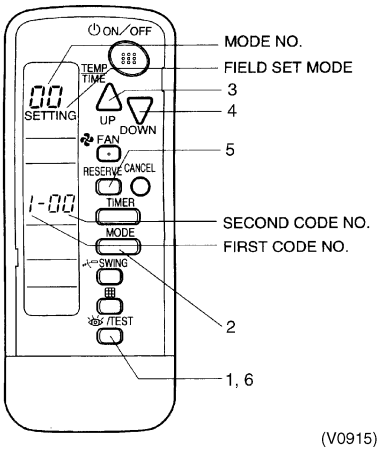
Field settings must be made by remote controller if optional accessories have been installed on the indoor unit, or if the indoor unit or HRV unit's individual functions have been modified.

1.15.1 Wired Remote Controller <CZ-01RT Type>



1. When in the normal mode, push the TEST button for 4 seconds or more, and operation then enters the "field set mode."
2. Select the desired "mode No." with the button.
3. During group control and you want to set by each individual indoor unit (when mode No. 20, 21, 22, 23, 25 has been selected), push the time mode button and select the "indoor unit No." to be set.
   Note: This operation is not required when setting as a group.
4. Push the button and select the first code No.
5. Push the button and select the second code No.
6. Push the timer button one time and "define" the currently set contents.
7. Push the TEST button to return to the normal mode.

1.15.2 Wireless Remote Controller <CZ-01·02RW Type>



1. When in the normal mode, push the /TEST button for 4 seconds or more, and operation then enters the "field set mode."
2. Select the desired "mode No." with the MODE button.
3. Pushing the UP button, select the first code No.
4. Pushing the DOWN button, select the second code No.
5. Push the RESERVE button and check the settings.
6. Push the /TEST button to return to the normal mode.

Notes:
1. Settings are made simultaneously for the entire group, however, if you select the mode No. inside parentheses, you can also set by each individual unit. Setting changes however cannot be checked except in the individual mode for those in parentheses.

2. The mode numbers inside parentheses cannot be used by wireless remote controllers, so they cannot be set individually. Setting changes also cannot be checked.
3. Mode numbers 17 (27) and 19 (29) are HRV functions that can be set from a UM Series remote controller.
4. The second code No. is factory set to “01.” The field set air flow direction position and thermostat sensor in remote controller is however set to “02,” and ventilation fan speed is set to “05.”
5. Do not make settings other than those described above. Nothing is displayed for functions the indoor unit is not equipped with.
6. “88” may be displayed to indicate the remote controller is resetting when returning to the normal mode.

1.15.3 Setting Contents and Code No.

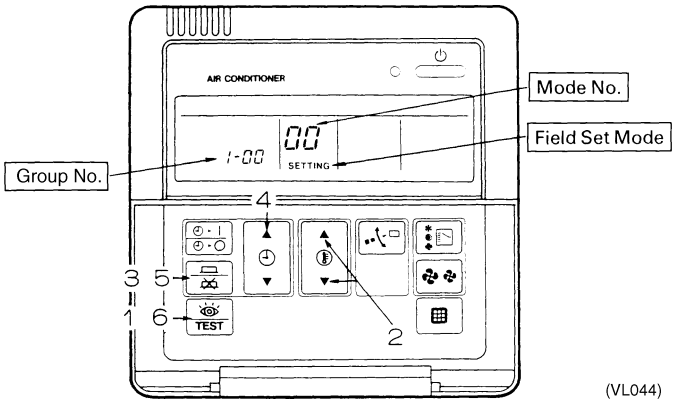
UM Series indoor unit settings	Mode No. Note 2	First Code No.	Setting Contents		Second Code No.(Note 3)							
					01		02		03		04	
	10(20)	0	Filter contamination heavy/light (Setting for display time to clean air filter) (Sets display time to clean air filter to half when there is heavy filter contamination.)	Super long life filter	Light	Approx. 10,000 hrs.	Heavy	Approx. 5,000 hrs.	—		—	
				Long life filter		Approx. 2,500 hrs.		Approx. 1,250 hrs.				
				Standard filter		Approx. 200 hrs.		Approx. 100 hrs.				
		1	Long life filter type (CS-LM only, 01 indicates long life)		Long life filter		Super long life filter		—		Soot filter	
		2	Thermostat sensor in remote controller		Use		No use		—			
		3	Display time to clean air filter calculation (Set when filter sign is not to be displayed.)		Display		No display		—			
	12(22)	0	Optional accessories output selection (field selection of output for adaptor for wiring)		Indoor unit turned ON by thermostat				Operation output		Malfunction output	
		1	ON/OFF input from outside (Set when ON/OFF is to be controlled from outside.)		Forced OFF		ON/OFF control		External protection device		—	
		2	Thermostat differential changeover (Set when remote sensor is to be used.) CS-LM, CS-UM, CS-DM, CS-TM only		1°C		0.5°C		—		—	
		3	OFF by thermostat fan speed		LL		Set fan speed		—		—	
		4	Automatic mode differential (automatic temperature differential setting for UM inverter series “ME1R Series” cool/heat)		01:0	02:1	03:2	4:03	05:4	6:05	7:06	08:7
		5	Power failure automatic reset		Not equipped		Equipped		—		—	
	13(23)	0	High air outlet velocity (Set when installed in place with ceiling higher than 2.7 m.) CS-UM only		N		H		—		—	
		1	Selection of air flow direction (Set when a blocking pad kit has been installed.) CS-UM only		F (4 directions)		T (3 directions)		W (2 directions)		—	
		2	Horizontal air discharge		Equipped		Not equipped		—		—	
		3	Air flow direction adjustment (Set at installation of decoration panel.) CS-DM only		Equipped		Not equipped		—		—	
		4	Field set air flow position setting		Draft prevention		Standard		Ceiling Soiling prevention		—	
		5	Field set fan speed selection (fan speed control by air discharge outlet for phase control)		Standard		Optional accessory 1		Optional accessory 2		—	
		6	Static pressure selection (for setting static pressure for ducts and others		Standard		High static pressure		Low static pressure		—	
	15(25)	1	Thermostat OFF excess humidity		Not equipped		Equipped		—		—	
		3	Drain pump humidifier interlock selection		Not equipped		Equipped		—		—	
		4	Sets whether filter sign is to be output by time or by input.		Time addition		Input		—		—	
		5	Field set selection for individual ventilation setting by remote controller		Not equipped		Equipped		—		—	
		6	Field set selection for individual ventilation setting by remote controller		Not equipped		Equipped		—		—	

1.16 Centralised Control Group No. Setting

CZ-01RT Type

- If carrying out centralized control by central remote controller or unified ON/OFF controller, group No. must be set for each group individually by remote controller.
- Group No. setting by remote controller for centralized control

1. When in the normal mode, push the TEST button for 4 seconds or more, and operation then enters the “field setting mode.”
2. Set mode No. “00” with the button. ∗
3. Push the button to inspect the group No. display.
4. Set the group No. for each group with the button (The group No. increases in the manner of 1-00, 1-01, ...,1-15, 2-00,...4-15. However, the unified ON/OFF controller displays only the group No. within the range selected by the switch for setting each address.)
5. Push the button to define the selected group No.
6. Push the TEST button to return to the normal mode.

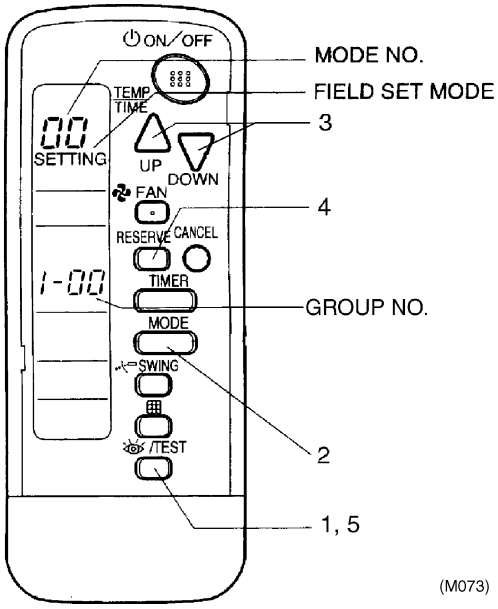


- Even if not using a remote controller, connect the remote controller when setting the group No., set the group No. for centralized control, and disconnect after making the setting.
- Set the group No. after turning on the power supply for the central remote controller, unified ON/OFF controller, and indoor unit.

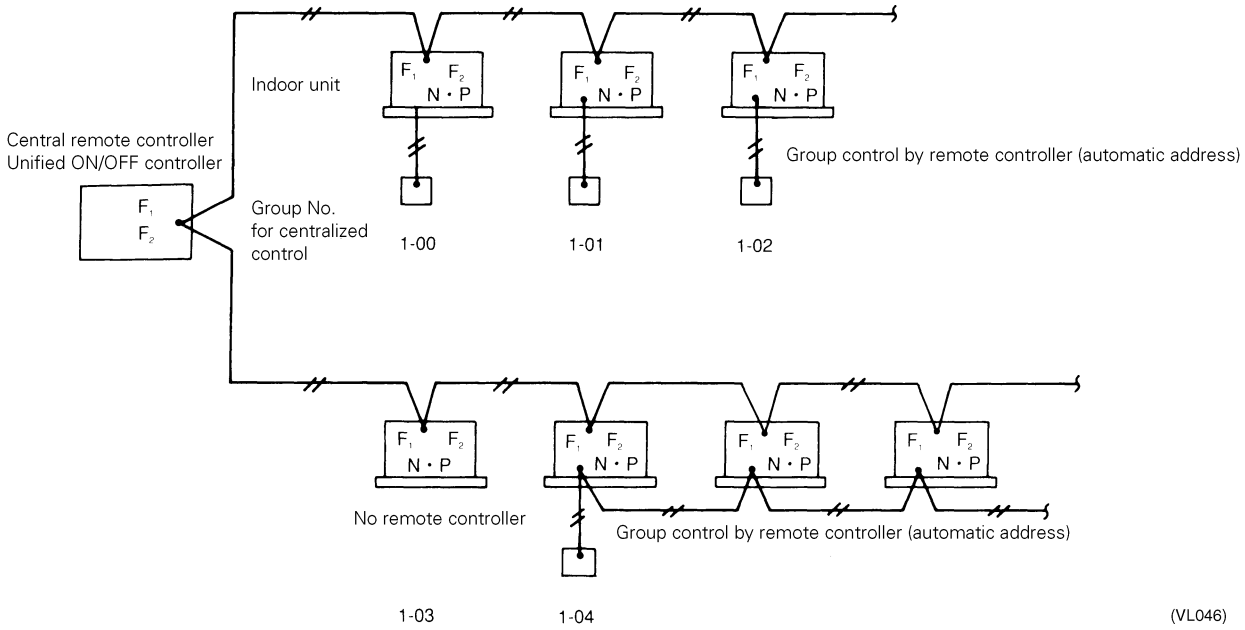
CZ-01·02RW Type

■ Group No. setting by wireless remote controller for centralized control

1. When in the normal mode, push the /TEST button for 4 seconds or more, and operation then enters the “field set mode.”
2. Set mode No. “00” with the MODE button.
3. Set the group No. for each group with the UP DOWN button (advance/backward).
4. Enter the selected group numbers by pushing the RESERVE button.
5. Push the /TEST button and return to the normal mode.



Group No. Setting Example



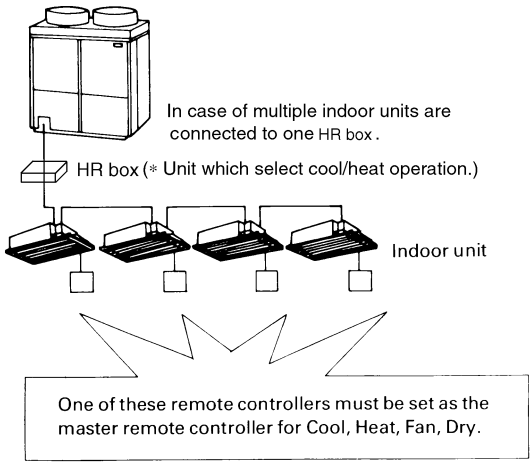
■ If you have to set the address for each unit for calculating cost, etc., set the mode No. to “30.”

1.17 Setting of Master Remote Controller

By Indoor Unit Remote Controller

Operation mode (Fan, Dry, Cool, Heat) can be freely selected by indoor unit remote controller for the UM series outdoor units, however, as shown in the example below, the remote controller of one of the indoor units connected to 1 outdoor unit must be set as the master remote controller for Fan, Dry, Cool, Heat. (Operation mode can be switched by only the remote controller set as the master remote controller.)

UM "MX1R, ME1R Series"


In case of multiple indoor units are connected to one HR box.
HR box (* Unit which select cool/heat operation.)
Indoor unit
One of these remote controllers must be set as the master remote controller for Cool, Heat, Fan, Dry.
(VL047)

Setting Method

Preparations

When turning the power supply on for the first time, the display of **<CHANGEOVER UNDER CONTROL>** lights. Start to set from 2.

Changing of master remote controller

1	Continue pushing **<OPERATION MODE SELECTOR>** button on remote controller which is not displaying <changeover under control> for about 4 seconds. The display of **<CHANGEOVER UNDER CONTROL>** on all remote controllers connected to the same outdoor unit blinks.

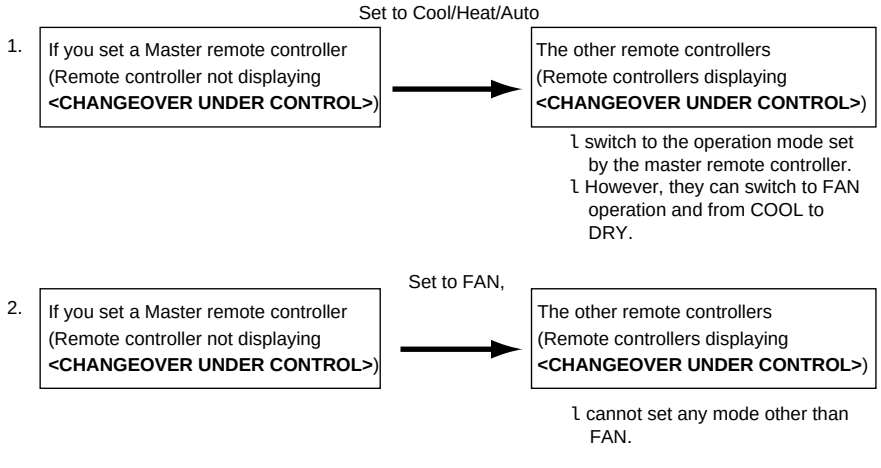
Setting of master remote controller

2	Push the **<OPERATION MODE SELECTOR>** of the remote controller you want to set as the master remote controller. This completes the setting. The remote controller is now set as the master remote controller and the display of **<CHANGEOVER UNDER CONTROL>** goes off. **<CHANGEOVER UNDER CONTROL>** is displayed on the other remote controllers.

Operation mode selection

3	Push the **<OPERATION MODE SELECTOR>** of the master remote controller (remote controller not displaying **<CHANGEOVER UNDER CONTROL>**) the amount of times required to select the desired operation mode. Each push switches the display from FAN to DRY, COOL, and HEAT. The operation mode changes automatically for all remote controllers that are not set as a master remote controller.

Operation Contents and Function



(VL049)

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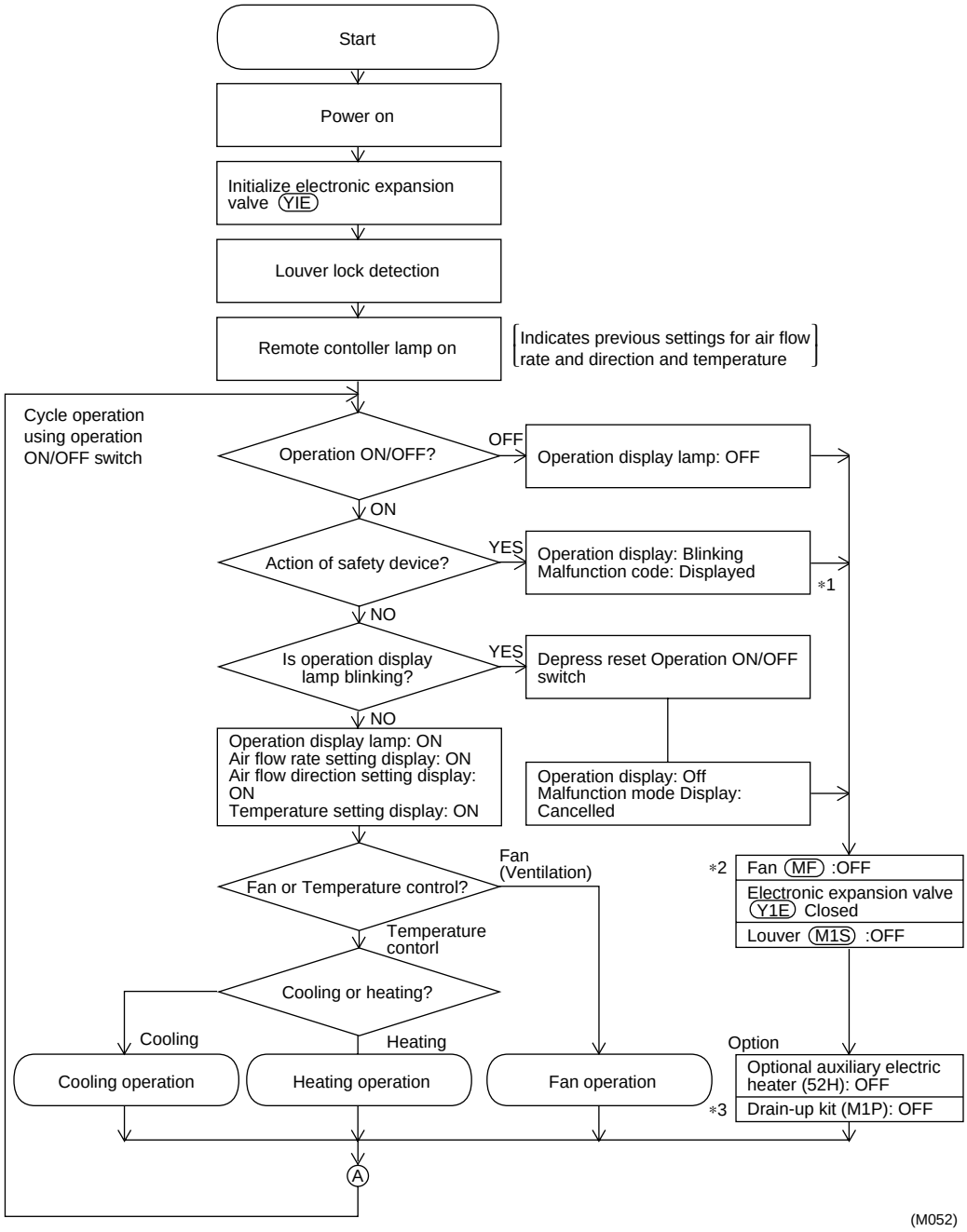
(Repeats Double Blink) 403

1. Operation Flowcharts

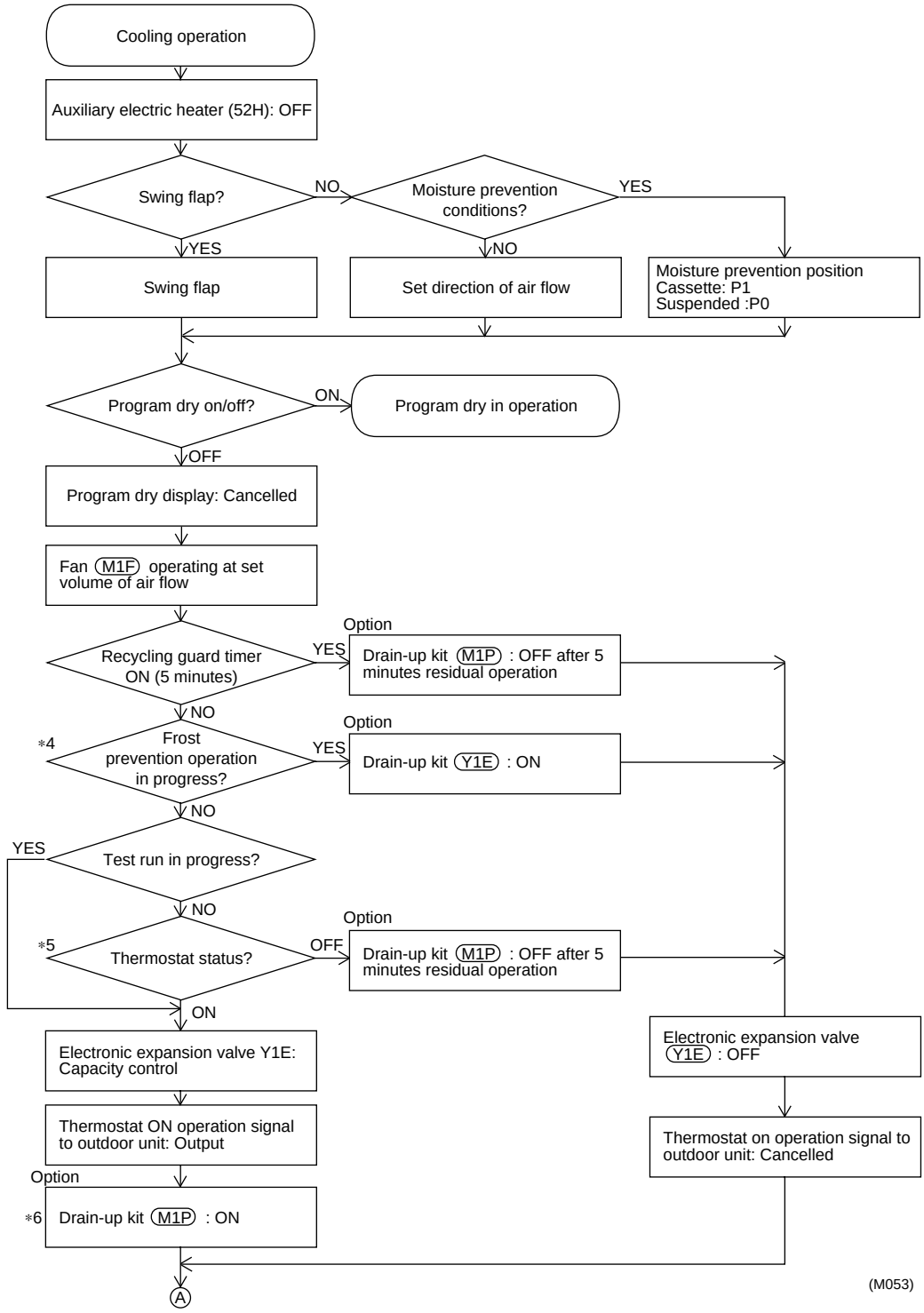
1.1 Indoor Unit Operation Flowchart



∗1 In the event of a malfunction, the malfunction code is displayed in the remote controller's malfunction code display.

∗2 When the auxiliary electric heater is on, the fan stops after one minute residual operation.

∗3 When the drain-up kit is ON, it stops after five minutes residual operation.

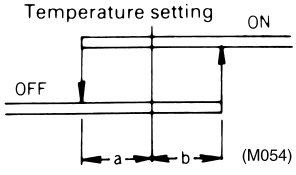


∗4 If the evaporator inlet temperature is -5°C or lower for a total of 10 minutes, or is -1°C or lower for a total of 40 minutes, frost prevention operation is initiated. Normal operation resumes when the temperature is +7°C or higher for 10 consecutive minutes.

∗5 Thermostat status

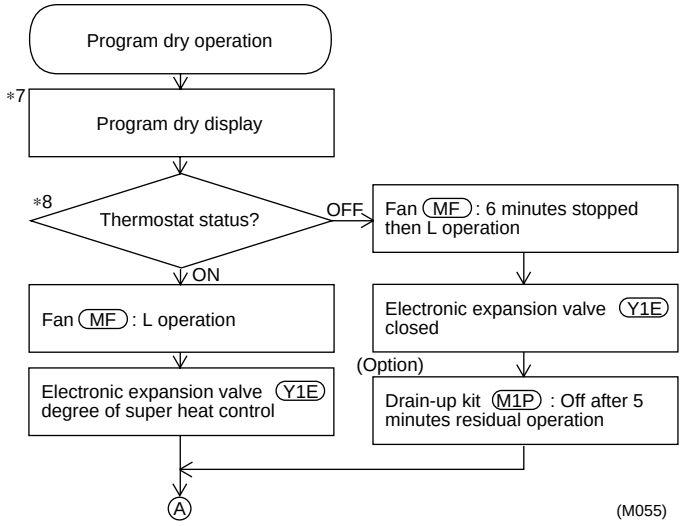
∗6 The drain-up kit is standard equipment for models CS-LM, CS-UM, CS-DM, and CS-FM.

Preset temperature



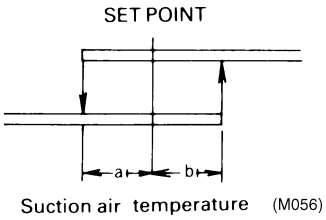
Intake air temperature

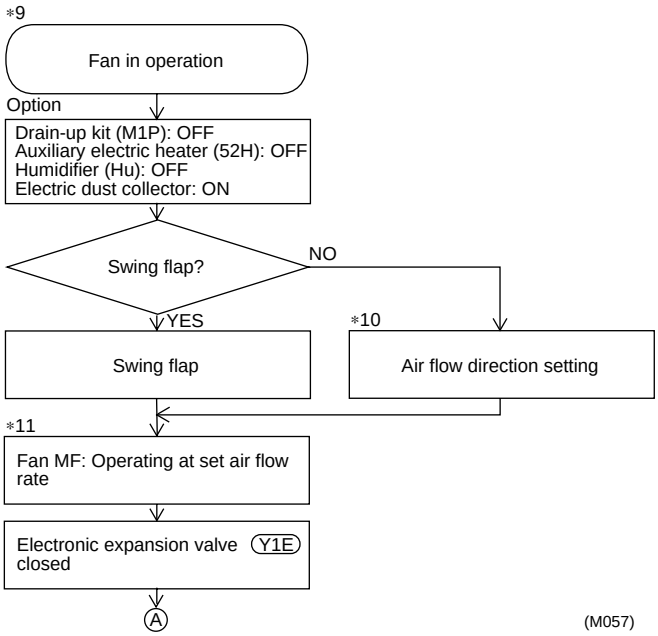
a = b = 1 (a = b = 0.5 possible for CS-LM, CS-UM, CS-TM, CS-DM only.)



*7 Programmed dry display
Does not display preset temperature and air flow settings of the controller.

*8 Thermostat status
Preset temperature during programmed dry operation.

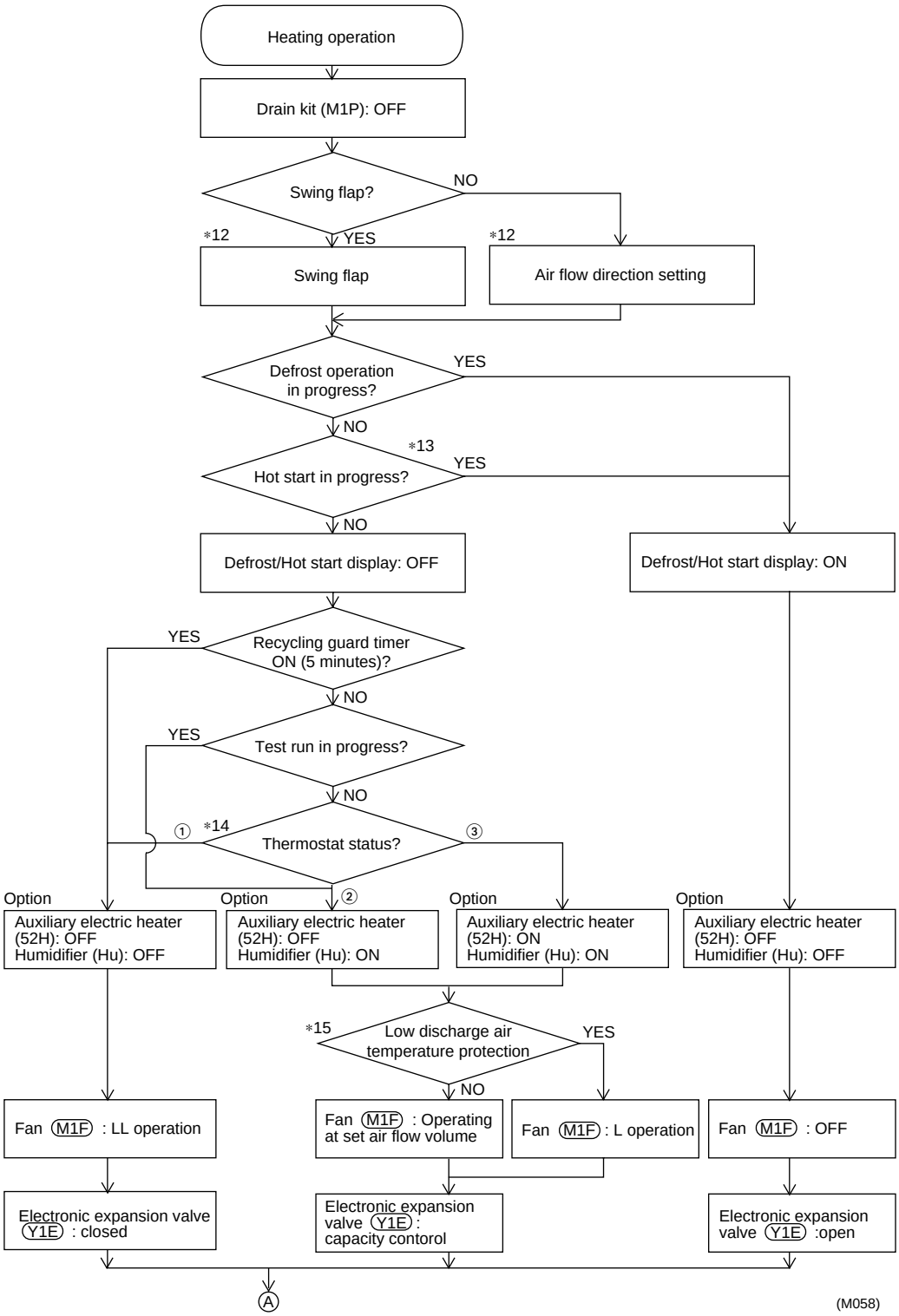




*9 Fan operation
When fan operation has been selected using the remote controller, operation is turned OFF by thermostat when temperature control operation has been selected.

*10 Air flow direction setting
If fan operation is selected with the remote controller, air discharge is 100% horizontal during heating.

*11 Fan
If fan operation is selected with the remote controller, LL speed operation is carried out during heating.



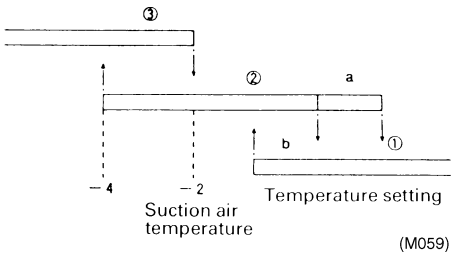
∗12 Air flow direction

Air discharge is 100% horizontal when heating operation is turned off by thermostat.

∗13 Hot start

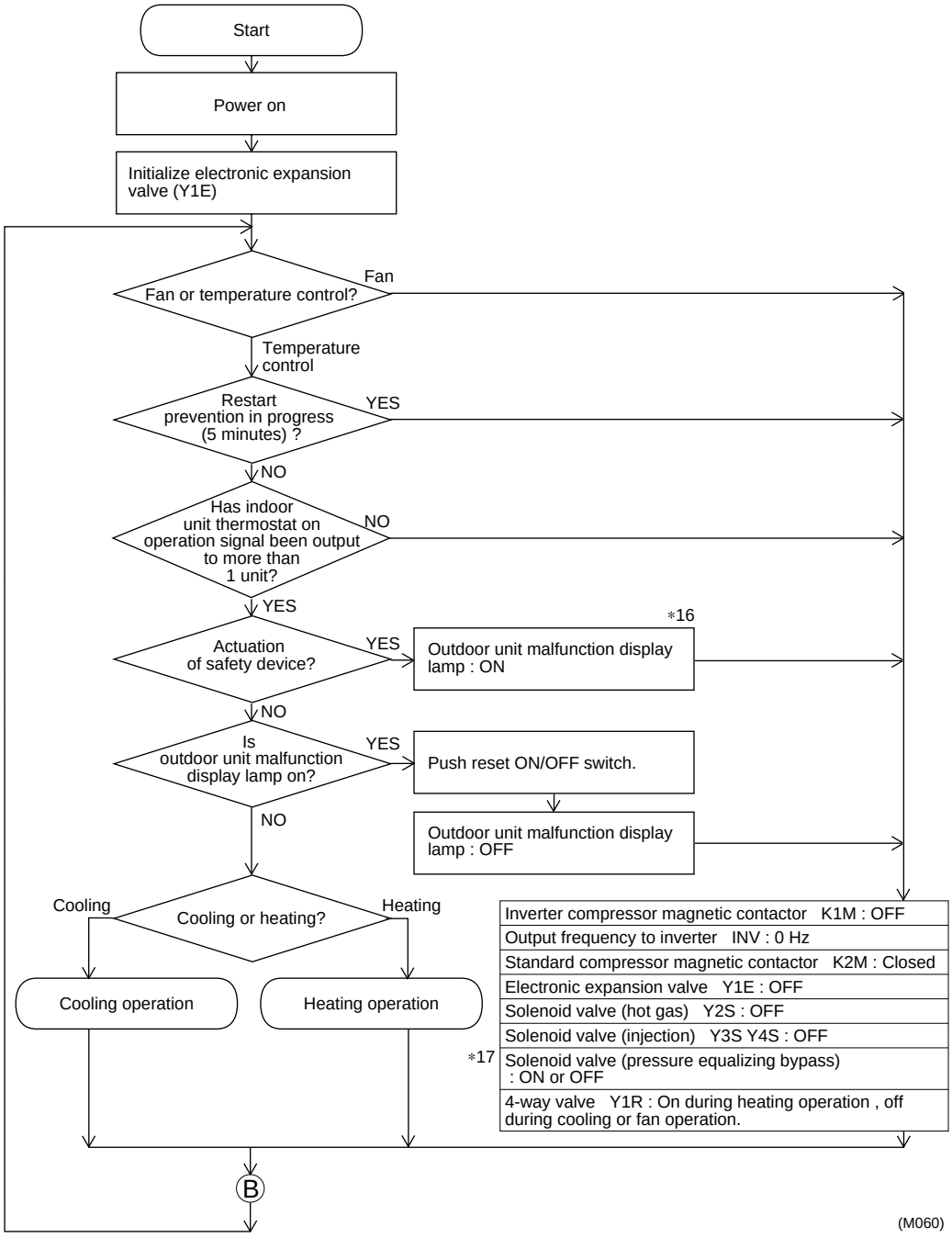
Hot start is carried out when operation starts or defrosting is complete, and condenser inlet temperature exceeds 34°C, or 3 minutes elapses, or when Tc > 52°C.

∗14 Thermostat status



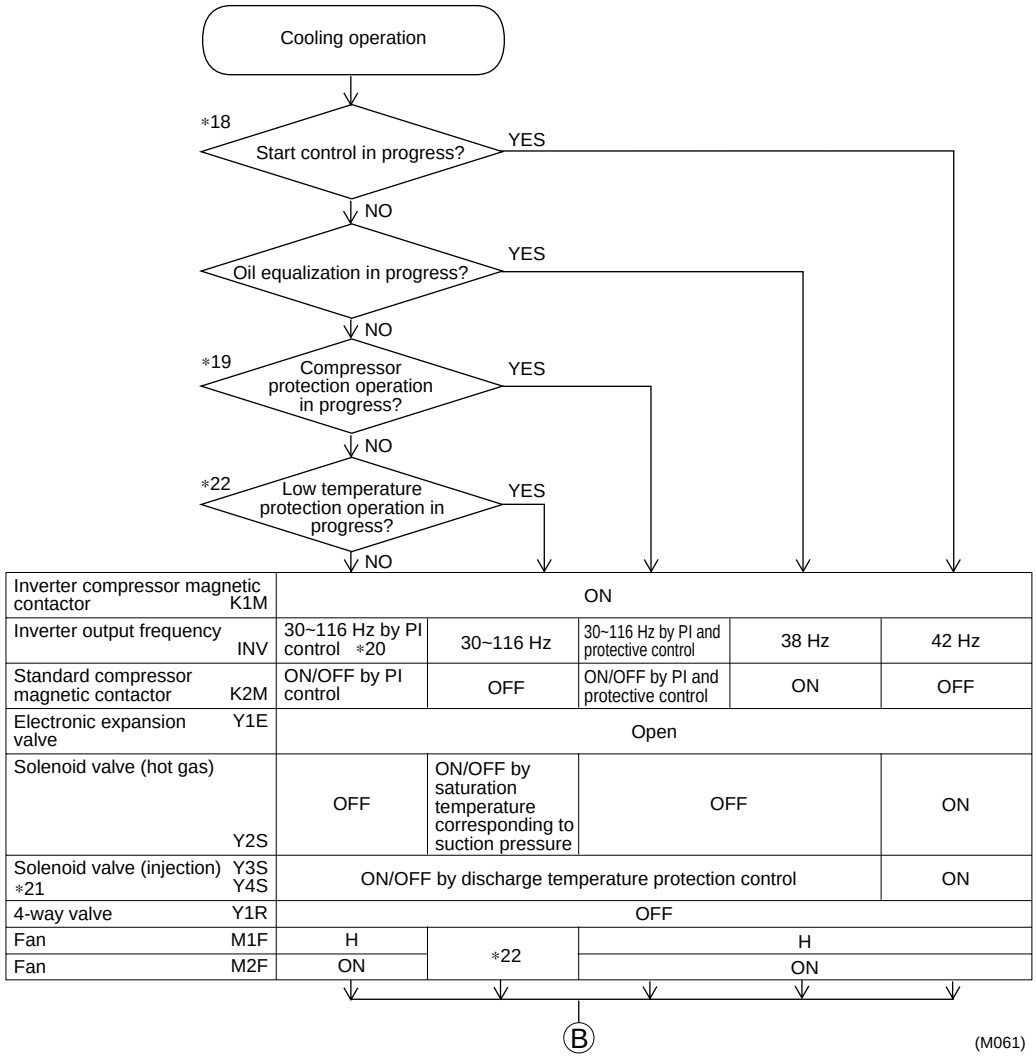
∗15 Low discharge air temperature protection
Protection is effected when the preset temperature is 24°C or lower and the opening of the electronic expansion valve is slight.

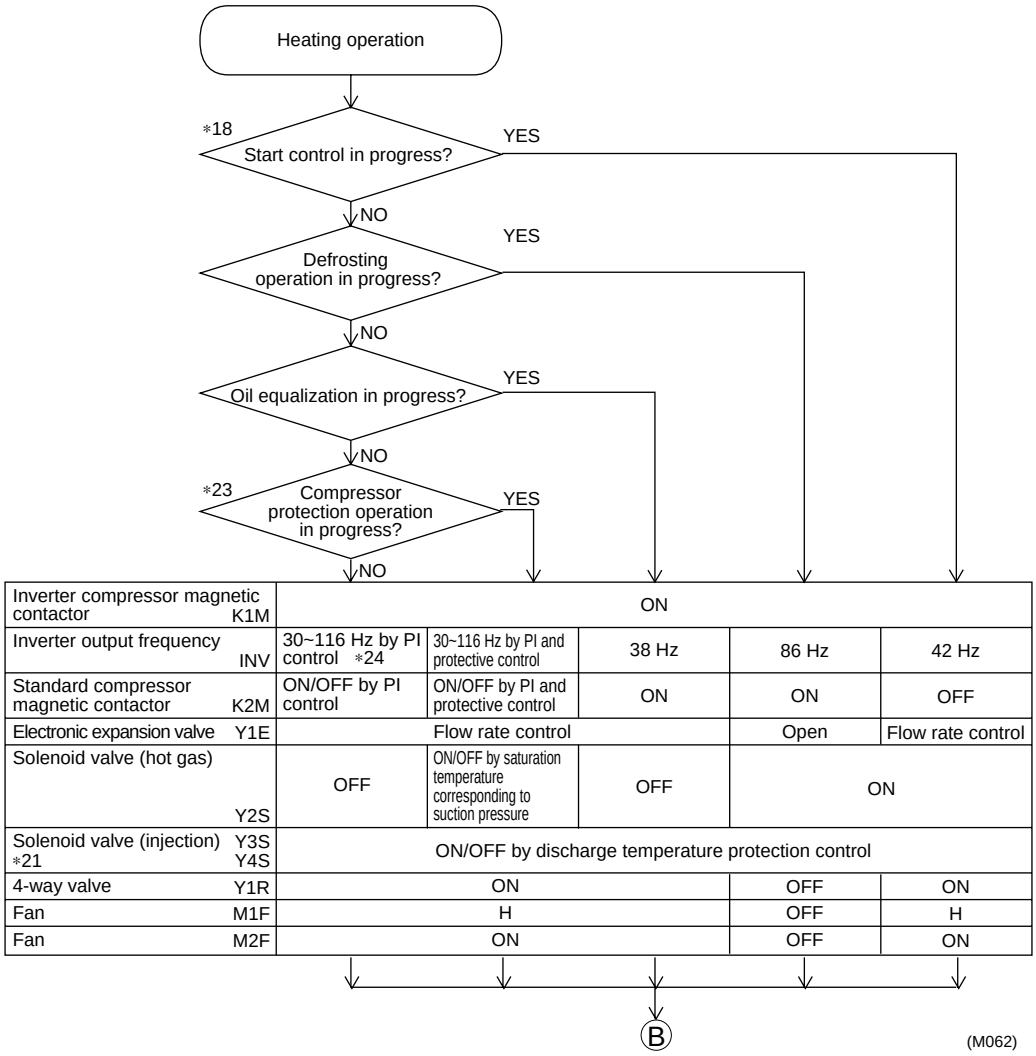
1.2 Outdoor Unit Operation Flowchart


Start
Power on
Initialize electronic expansion valve (Y1E)
Fan or temperature control?
Fan
Temperature control
Restart prevention in progress (5 minutes) ?
YES
NO
Has indoor unit thermostat on operation signal been output to more than 1 unit?
NO
YES
Actuation of safety device?
YES
∗16
Outdoor unit malfunction display lamp : ON
NO
Is outdoor unit malfunction display lamp on?
YES
Push reset ON/OFF switch.
NO
Outdoor unit malfunction display lamp : OFF
Cooling or heating?
Cooling
Heating
Cooling operation
Heating operation
∗17
Inverter compressor magnetic contactor K1M : OFF
Output frequency to inverter INV : 0 Hz
Standard compressor magnetic contactor K2M : Closed
Electronic expansion valve Y1E : OFF
Solenoid valve (hot gas) Y2S : OFF
Solenoid valve (injection) Y3S Y4S : OFF
Solenoid valve (pressure equalizing bypass) : ON or OFF
4-way valve Y1R : On during heating operation , off during cooling or fan operation.
B
(M060)

∗16 If the outdoor unit malfunction display lamp is on then this either indicates that the outdoor unit operation has been terminated abnormally or warns that there is refrigerant shortage or else that there is a piping or wiring fault (operations will continue). (Refer to Indoor Unit Control ∗1)

∗17 Keep on operations for 15 minutes after the inverter compressor has stopped.
Note: The crank case heaters (CH) are on when the magnetic relays of their respective compressors are off.


Cooling operation
∗18
Start control in progress?
YES
NO
Oil equalization in progress?
YES
NO
∗19
Compressor protection operation in progress?
YES
NO
∗22
Low temperature protection operation in progress?
YES
NO
Inverter compressor magnetic contactor K1M
ON
Inverter output frequency INV
30~116 Hz by PI control ∗20
30~116 Hz
30~116 Hz by PI and protective control
38 Hz
42 Hz
Standard compressor magnetic contactor K2M
ON/OFF by PI control
OFF
ON/OFF by PI and protective control
ON
OFF
Electronic expansion valve Y1E
Open
Solenoid valve (hot gas) Y2S
OFF
ON/OFF by saturation temperature corresponding to suction pressure
OFF
ON
Solenoid valve (injection) Y3S Y4S ∗21
ON/OFF by discharge temperature protection control
ON
4-way valve Y1R
OFF
Fan M1F
H
∗22
H
Fan M2F
ON
ON
B
(M061)

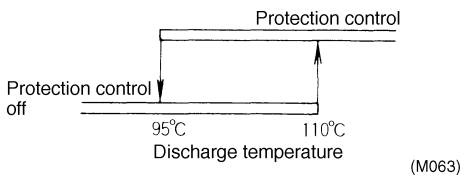


∗18 Start control

60 second start control in order to prevent liquid back to the compressor.

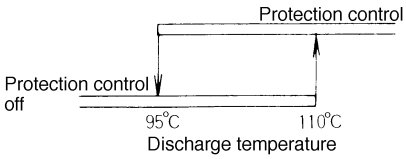
∗19 Compressor protection

1. Protection control is triggered when the cooling load is large and the saturation temperature corresponding to suction pressure is high.
2. Protection control is triggered when secondary inverter current exceeds set current.
3. Protection control is triggered by discharge temperature.
4. Protection control is triggered when saturation temperature corresponding to suction pressure is low.



∗20 PI control
Controls ON/OFF of the standard compressor and inverter output frequency so that suction pressure is the optimal value.

∗21 Discharge temperature protection

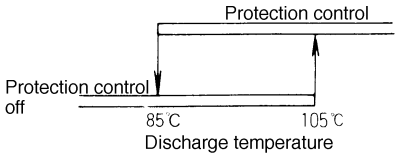


(M064)

∗22 Fan control during low temperature protection
If Tc is less than 26.1°C for 30 continuous seconds, fan speed changes as follows: H + ON / H + OFF / L + OFF. When Tc becomes greater than 52.4°C, fan speed returns to H + ON.

∗23 Compressor protection

1. Protection control is triggered when secondary inverter current exceeds set current.
2. Protection control is triggered by discharge temperature.



(M065)

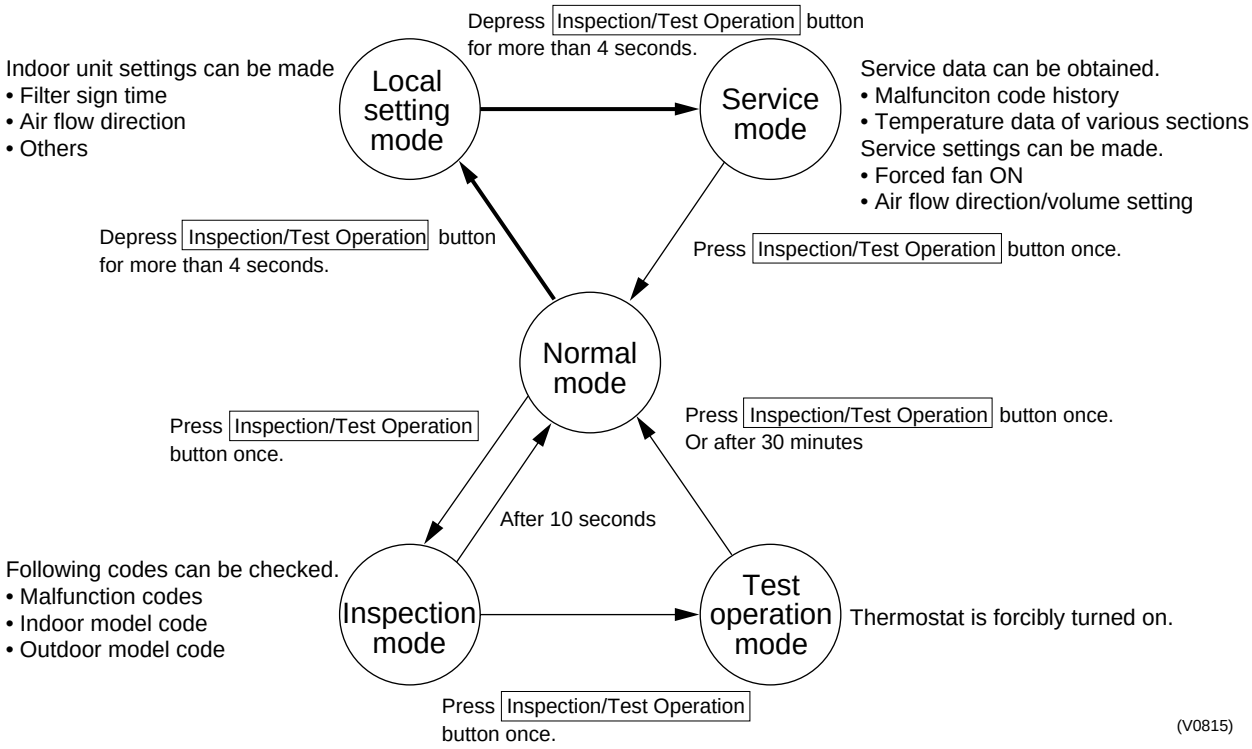
3. Protection control is triggered when the heating load is small and the saturation temperature corresponding to suction pressure is high.
4. Protection control is triggered when saturation temperature corresponding to suction pressure is low.

∗24 PI control
Controls ON/OFF of the standard compressor and inverter output frequency so that discharge pressure is the optimal value.

2. Troubleshooting by Remote Controller

2.1 The INSPECTION / TEST Button

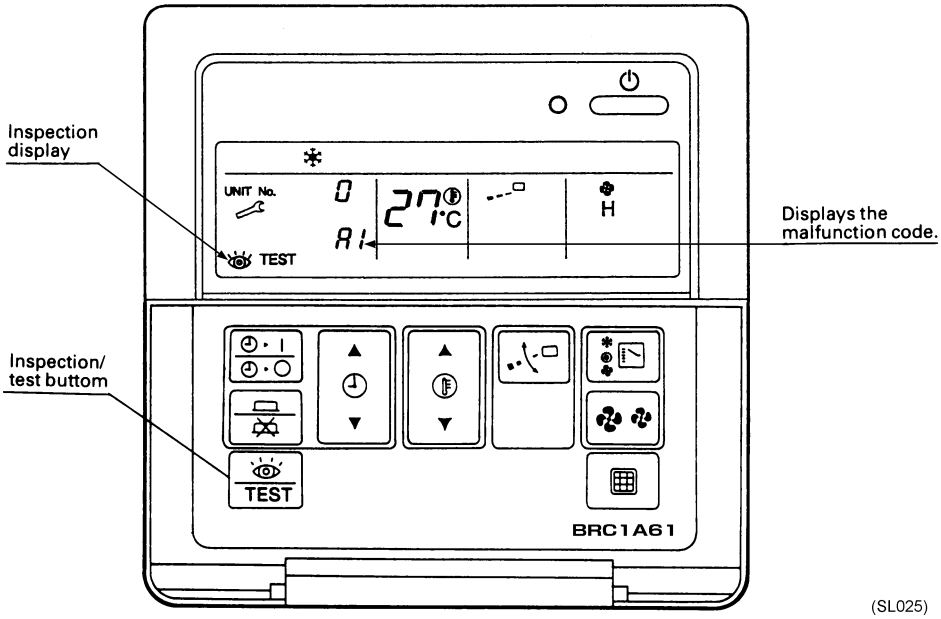
The following modes can be selected by using the [Inspection/Test Operation] button on the remote control.


Depress Inspection/Test Operation button for more than 4 seconds.
Indoor unit settings can be made
• Filter sign time
• Air flow direction
• Others
Local setting mode
Service mode
Service data can be obtained.
• Malfunciton code history
• Temperature data of various sections
Service settings can be made.
• Forced fan ON
• Air flow direction/volume setting
Depress Inspection/Test Operation button for more than 4 seconds.
Press Inspection/Test Operation button once.
Normal mode
Press Inspection/Test Operation button once.
Press Inspection/Test Operation button once.
Or after 30 minutes
After 10 seconds
Following codes can be checked.
• Malfunction codes
• Indoor model code
• Outdoor model code
Inspection mode
Test operation mode
Thermostat is forcibly turned on.
Press Inspection/Test Operation button once.
(V0815)

2.2 Self-diagnosis by Wired Remote Controller

Explanation

If operation stops due to malfunction, the remote controller's operation LED blinks, and malfunction code is displayed. (Even if stop operation is carried out, malfunction contents are displayed when the inspection mode is entered.) The malfunction code enables you to tell what kind of malfunction caused operation to stop. See page 342 for malfunction code and malfunction contents.



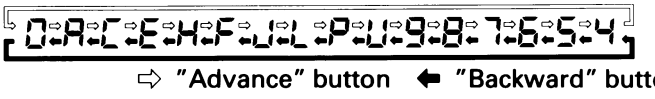
2.3 Self-diagnosis by Wireless Remote Controller

In the Case of CZ-01RW Type

If equipment stops due to a malfunction, the operation indicating LED on the light reception section flashes. The malfunction code can be determined by following the procedure described below. (The malfunction code is displayed when an operation error has occurred. In normal condition, the malfunction code of the last problem is displayed.)

1. Press the INSPECTION/TEST button to select “Inspection.”
   The equipment enters the inspection mode. The “Unit” indication lights and the Unit No. display shows flashing “0” indication.
2. Set the Unit No.
   Press the UP or DOWN button and change the Unit No. display until the buzzer (*1) is generated from the indoor unit.
   *1 Number of beeps
   3 short beeps : Conduct all of the following operations.
   1 short beep : Conduct steps 3 and 4.
   Continue the operation in step 4 until a buzzer remains ON. The continuous buzzer indicates that the malfunction code is confirmed.
   Continuous beep : No abnormality.
3. Press the MODE selector button.
   The left “0” (upper digit) indication of the malfunction code flashes.
4. Malfunction code upper digit diagnosis
   Press the UP or DOWN button and change the malfunction code upper digit until the malfunction code matching buzzer (*2) is generated.

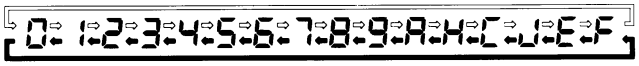
■ The upper digit of the code changes as shown below when the UP and DOWN buttons are pressed.



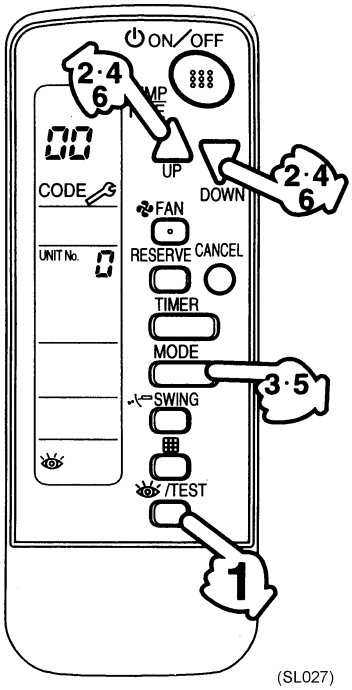
*2 Number of beeps
Continuous beep : Both upper and lower digits matched. (Malfunction code confirmed)
2 short beeps : Upper digit matched.
1 short beep : Lower digit matched.

5. Press the MODE selector button.
   The right “0” (lower digit) indication of the malfunction code flashes.
6. Malfunction code lower digit diagnosis
   Press the UP or DOWN button and change the malfunction code lower digit until the continuous malfunction code matching buzzer (*2) is generated.

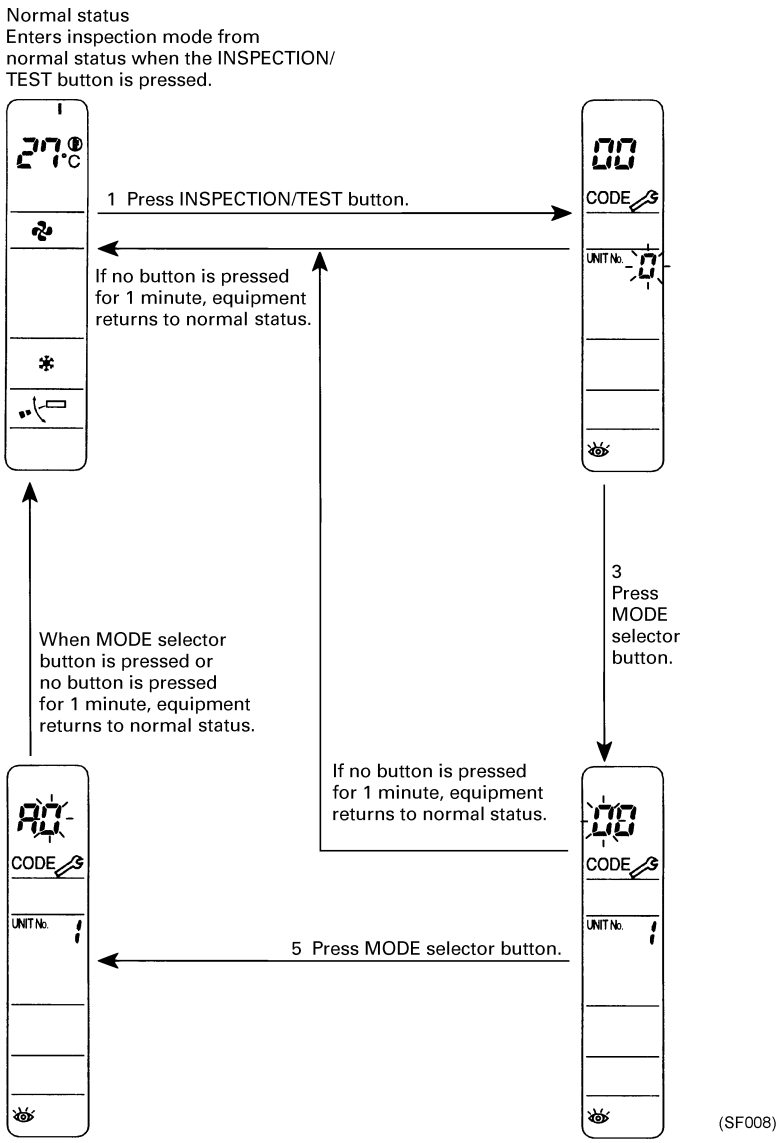
■ The lower digit of the code changes as shown below when the UP and DOWN buttons are pressed.



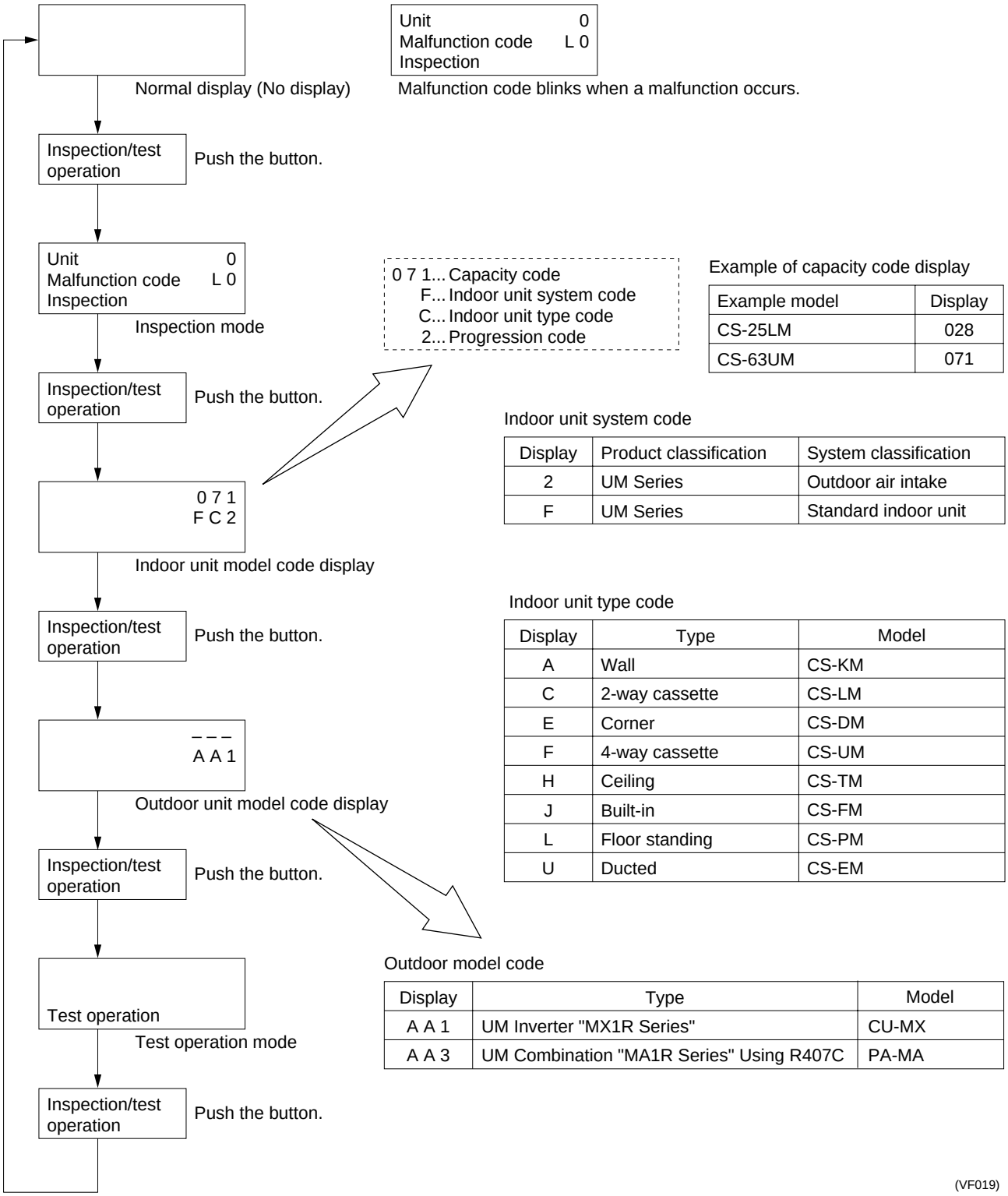
(SE007)



(SL027)


Normal status
Enters inspection mode from normal status when the INSPECTION/ TEST button is pressed.
27°C
00
CODE
UNIT No.
0
1 Press INSPECTION/TEST button.
If no button is pressed for 1 minute, equipment returns to normal status.
3 Press MODE selector button.
When MODE selector button is pressed or no button is pressed for 1 minute, equipment returns to normal status.
If no button is pressed for 1 minute, equipment returns to normal status.
A0
CODE
UNIT No.
1
00
CODE
UNIT No.
1
5 Press MODE selector button.
(SF008)

2.4 Operation of The Remote Controller's Inspection / Test Operation Button



Example of capacity code display

Example model	Display
CS-25LM	028
CS-63UM	071

Indoor unit system code

Display	Product classification	System classification
2	UM Series	Outdoor air intake
F	UM Series	Standard indoor unit

Indoor unit type code

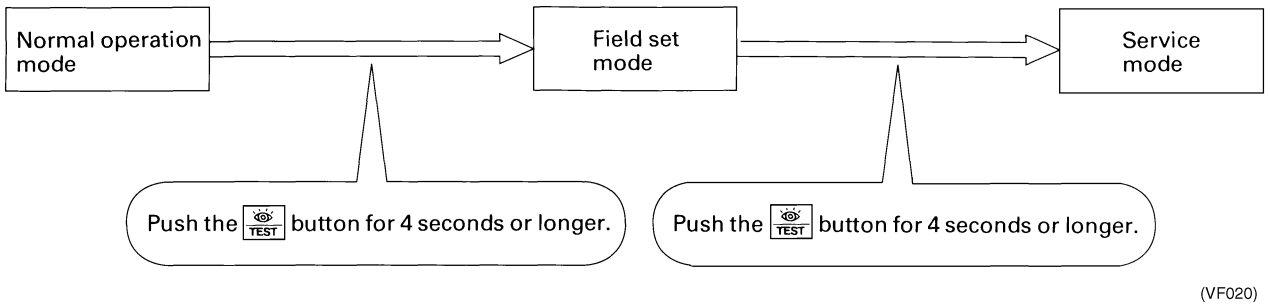
Display	Type	Model
A	Wall	CS-KM
C	2-way cassette	CS-LM
E	Corner	CS-DM
F	4-way cassette	CS-UM
H	Ceiling	CS-TM
J	Built-in	CS-FM
L	Floor standing	CS-PM
U	Ducted	CS-EM

Outdoor model code

Display	Type	Model
A A 1	UM Inverter "MX1R Series"	CU-MX
A A 3	UM Combination "MA1R Series" Using R407C	PA-MA

2.5 Remote Controller Service Mode

How to Enter the Service Mode


Normal operation mode
Field set mode
Service mode
Push the TEST button for 4 seconds or longer.
Push the TEST button for 4 seconds or longer.

(VF020)

Service Mode Operation Method

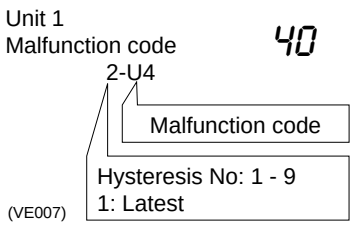
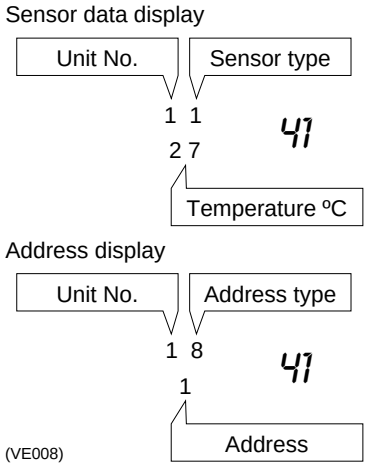
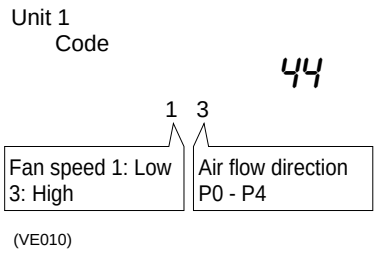
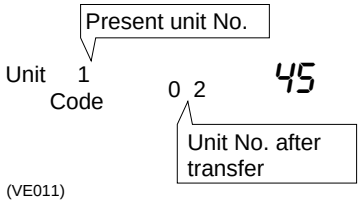
1. Select the mode No.
Set the desired mode No. with the button.
(For wireless remote controller, Mode 43 only can be set.)

2. Select the unit No. (For group control only)
Select the indoor unit No. to be set with the time mode . (For wireless remote controller, UP DOWN button.)

3. Make the settings required for each mode. (Modes 41, 44, 45)
In case of Mode 44, 45, push the timer button to be able to change setting before setting work. (LCD “code” blinks.)
For details, refer to the table in next page.

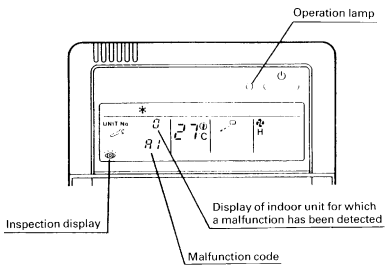
4. Define the setting contents. (Modes 44, 45)
Define by pushing the timer button.
After defining, LCD “code” changes blinking to ON.

5. Return to the normal operation mode.
Push the TEST button one time.

Mode No	Function	Contents and operation method	Remote controller display example
40	Malfunction hysteresis display	Display malfunction hysteresis. The hysteresis No. can be changed with the button.	
41	Display of sensor and address data	Display various types of data. Select the data to be displayed with the button. Sensor data 0: Thermostat sensor in remote controller. 1: Suction 2: Liquid pipe 3: Gas pipe Address data 4: Indoor unit address 5: Outdoor unit address 6: HR box address 7: Zone control address 8: Cool/heat group address 9: Demand / low noise address	
43	Forced fan ON	Manually turn the fan ON by each unit. (When you want to search for the unit No.) By selecting the unit No. with the button, you can turn the fan of each indoor unit on (forced ON) individually.	
44	Individual setting	Set the fan speed and air flow direction by each unit Select the unit No. with the time mode button. Set the fan speed with the button Set the air flow direction with the button.	
45	Unit No. transfer	Transfer unit No. Select the unit No. with the button. Set the unit No. after transfer with the button.	
46 47	This function is not used by UM “MX1R Series”.		

2.6 Remote Controller Self-Diagnosis Function (Display of Malfunction Code)

The remote controller switches are equipped with a self diagnosis function so that more appropriate maintenance can be carried out. If a malfunction occurs during operation, the operation lamp, malfunction code and display of malfunctioning unit No. let you know the contents and location of the malfunction. When there is a stop due to malfunction, the contents of the malfunction given below can be diagnosed by a combination of operation lamp, INSPECTION display of the liquid crystal display and display of malfunction code. It also lets you know the unit No. during group control.



(VL050)

Malfunction Code List

	Malfunction code	Operation lamp	Inspection display	Unit No.	Malfunction contents	Page Refered
Indoor Unit	A0	◑	◑	◑	Error of external protection device	344
	A1	◑	◑	◑	PC board defect	345
	A1	○	●	◑	PC board defect	345
	A3	◑	◑	◑	Malfunction of drain level control system (33H)	346
	A6	◑	◑	◑	Fan motor (M1F) lock, Overload	347
	A7	○	●	◑	Malfunction of swing flap motor (M1S)	348
	A9	◑	◑	◑	Malfunction of moving part of electronic expansion valve (Y1E)	349
	AF	○	●	◑	Drain level above limit	350
	AH	◑	◑	◑	Malfunction of air filter maintenance	—
	AJ	◑	◑	◑	Malfunction of capacity determination device	351
	C4	◑	◑	◑	Malfunction of thermistor (R2T) for liquid pipe (loose connection, disconnection, short circuit, failure)	352
	C5	◑	◑	◑	Malfunction of thermistor (R3T) for gas pipes (loose connection, disconnection, short circuit, failure)	353
	C9	◑	◑	◑	Malfunction of thermistor (R1T) for air inlet (loose connection, disconnection, short circuit, failure)	354
	CJ	○	○	○	Malfunction of thermostat sensor in remote controller	355
Outdoor Unit	E0	◑	◑	◑	Actuation of safety device	356
	E1	◑	◑	◑	PC board defect	357
	E1	○	●	◑	PC board defect	357
	E3	◑	◑	◑	Actuation of high pressure switch	358
	E4	◑	◑	◑	Actuation of low pressure switch	359
	E9	◑	◑	◑	Malfunction of moving part of electronic expansion valve (Y1E)	360
	F3	◑	◑	◑	Abnormal discharge pipe temperature	361
	H3	○	●	◑	High pressure switch failure	—
	H4	◑	◑	◑	Actuation of low pressure switch	—
	H9	◑	◑	◑	Malfunction of thermistor (R1T) for outdoor air (loose connection, disconnection, short circuit, failure)	362
	H9	○	●	◑	Malfunction of thermistor (R1T) for outdoor air (loose connection, disconnection, short circuit, failure)	362
	J1	◑	◑	◑	Malfunction of pressure sensor	—
	J3	◑	◑	◑	Malfunction of discharge pipe thermistor (R3T) (loose connection, disconnection, short circuit, failure)	363
	J3	○	●	◑	Malfunction of discharge pipe thermistor (R3T) (loose connection, disconnection, short circuit, failure)	363
	J5	◑	◑	◑	Malfunction of thermistor (R4T) for suction pipe (loose connection, disconnection, short circuit, failure)	364

	Malfunction code	Operation lamp	Inspection display	Unit No.	Malfunction contents	Page Refered
Outdoor Unit	J6	◑	◑	◑	Malfunction of thermistor (R2T) for heat exchanger (loose connection, disconnection, short circuit, failure)	365
	J6	○	●	◑	Malfunction of thermistor (R2T) for heat exchanger (loose connection, disconnection, short circuit, failure)	365
	JA	◑	◑	◑	Malfunction of discharge pipe pressure sensor	366
	JC	◑	◑	◑	Malfunction of suction pipe pressure sensor	367
	JH	○	●	◑	Malfunction of oil temperature thermistor (R5T)	368
	L0	◑	◑	◑	Failure of inverter system	—
	L4	◑	◑	◑	Malfunction of inverter radiating fin temperature rise	382
	L5	◑	◑	◑	Inverter instantaneous over-current	383
	L6	◑	◑	◑	Compressor motor insulation defect, short circuit	—
	L8	◑	◑	◑	Inverter thermostat sensor, Compressor overload	384
	L9	◑	◑	◑	Inverter stall prevention, Compressor lock	385
	LA	◑	◑	◑	Malfunction of power unit	—
	LC	◑	◑	◑	Malfunction of transmission between inverter and control PC board	386
System	P0	◑	●	◑	Gas depletion (heat build up)	—
	P1	◑	◑	◑	Inverter over-ripple protection	388
	P4	◑	◑	◑	Malfunction of inverter radiating fin temperature rise sensor	389
	U0	○	●	◑	Low pressure drop due to refrigerant shortage or electronic expansion valve failure	369
	U1	◑	◑	◑	Negative phase / open phase	370
	U2	◑	◑	◑	Power supply insufficient or instantaneous failure	387
	U4	◑	◑	◑	Malfunction of transmission between indoor units	371
	U5	◑	◑	◑	Malfunction of transmission between remote controller and indoor unit	372
	U5	●	○	●	Failure of remote controller PC board or setting during control by remote controller	—
	U7	◑	◑	◑	Malfunction of transmission between indoor units Malfunction of transmission between outdoor units, malfunction of transmission between outdoor unit and ice build-up heat unit	—
	U7	○	●	◑	Malfunction of transmission between outdoor units (cool/ heat unified, low noise)	373
	U8	◑	◑	●	Malfunction of transmission between master and slave remote controllers (malfunction of slave remote controller)	374
	U9	◑	◑	◑	Malfunction of transmission between indoor and outdoor units in the same system	375
	UA	◑	◑	◑	Excessive number of indoor units	376
	UC	○	○	○	Address duplication of central remote controller	377
	UE	◑	◑	◑	Malfunction of transmission between central remote controller and indoor unit	390
	UF	◑	◑	◑	Refrigerant system not set, incompatible wiring / piping	378
	UH	◑	◑	◑	Malfunction of system, refrigerant system address undefined	379
Centralized Control and Schedule Timer	UE	◑	◑	◑	Malfunction of transmission between central remote controller and indoor unit	390 395
	M1	○ or ◑	◑	◑	PC board defect	391 396
	M8	○ or ◑	◑	◑	Malfunction of transmission between optional controllers for centralised control	392 397
	MA	○ or ◑	◑	◑	Improper combination of optional controllers for centralised control	393 398
	MC	○ or ◑	◑	◑	Address duplication, improper setting	394 399

In case of the malfunction with the shaded error code, the unit still operates. However, be sure to have it inspected and repaired and as soon as possible.

3. Troubleshooting

3.1 Indoor Unit: Error of External Protection Device

Remote Controller Display

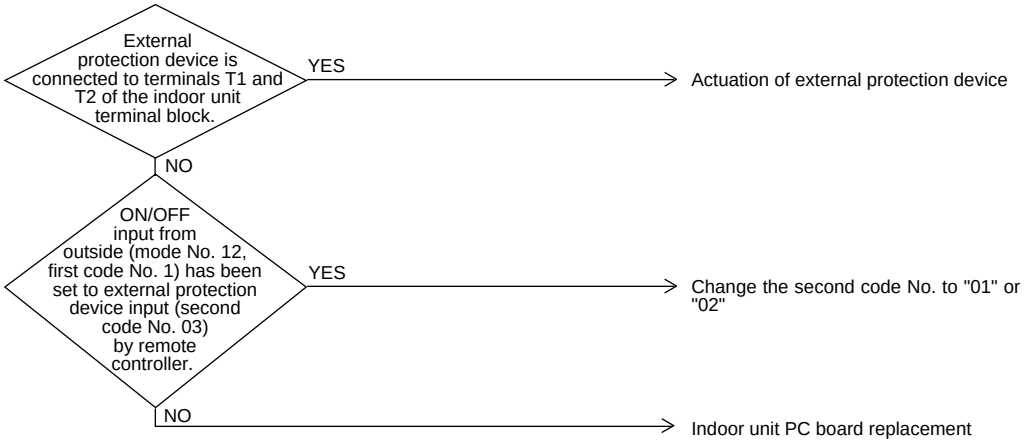
A0

Supposed Causes

- Actuation of external protection device
- Improper field set
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


External protection device is connected to terminals T1 and T2 of the indoor unit terminal block.
YES
Actuation of external protection device
NO
ON/OFF input from outside (mode No. 12, first code No. 1) has been set to external protection device input (second code No. 03) by remote controller.
YES
Change the second code No. to "01" or "02"
NO
Indoor unit PC board replacement

(VF029)

3.2 Indoor Unit: PC Board Defect

Remote Controller Display	A1
Supposed Causes	■ Defect of indoor unit PC board
Troubleshooting	Replace the indoor unit PC board.

3.3 Indoor Unit: Malfunction of Drain Level Control System (33H)

Remote Controller Display

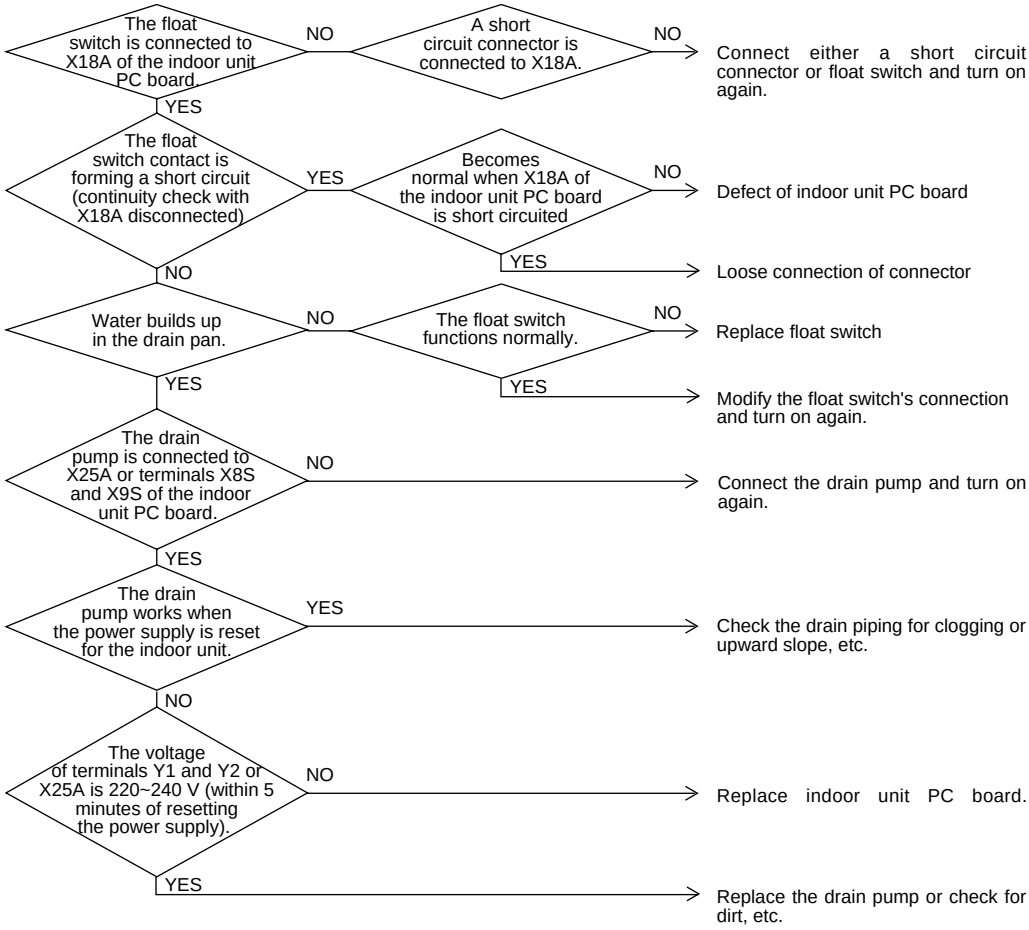
A3

Supposed Causes

- Defect of float switch or short circuit connector
- Defect of drain pump
- Drain clogging, upward slope, etc.
- Defect of indoor unit PC board
- Loose connection of connector

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The float switch is connected to X18A of the indoor unit PC board.
NO
A short circuit connector is connected to X18A.
NO
Connect either a short circuit connector or float switch and turn on again.
YES
The float switch contact is forming a short circuit (continuity check with X18A disconnected)
YES
Becomes normal when X18A of the indoor unit PC board is short circuited
NO
Defect of indoor unit PC board
YES
Loose connection of connector
NO
Water builds up in the drain pan.
NO
The float switch functions normally.
NO
Replace float switch
YES
YES
Modify the float switch's connection and turn on again.
The drain pump is connected to X25A or terminals X8S and X9S of the indoor unit PC board.
NO
Connect the drain pump and turn on again.
YES
The drain pump works when the power supply is reset for the indoor unit.
YES
Check the drain piping for clogging or upward slope, etc.
NO
The voltage of terminals Y1 and Y2 or X25A is 220~240 V (within 5 minutes of resetting the power supply).
NO
Replace indoor unit PC board.
YES
Replace the drain pump or check for dirt, etc.

(VF030)

3.4 Indoor Unit: Fan Motor (M1F) Lock, Overload

Remote Controller Display

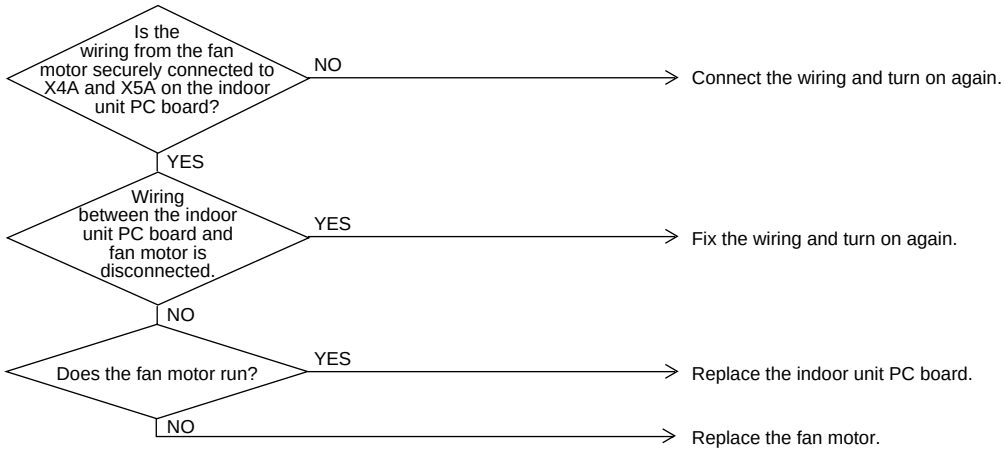
A6

Supposed Causes

- Fan motor lock
- Disconnected or faulty wiring between fan motor and PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is the wiring from the fan motor securely connected to X4A and X5A on the indoor unit PC board?
NO
Connect the wiring and turn on again.
YES
Wiring between the indoor unit PC board and fan motor is disconnected.
YES
Fix the wiring and turn on again.
NO
Does the fan motor run?
YES
Replace the indoor unit PC board.
NO
Replace the fan motor.

(VF031)

3.5 Indoor Unit: Malfunction of Swing Flap Motor (M1S)

Remote Controller Display

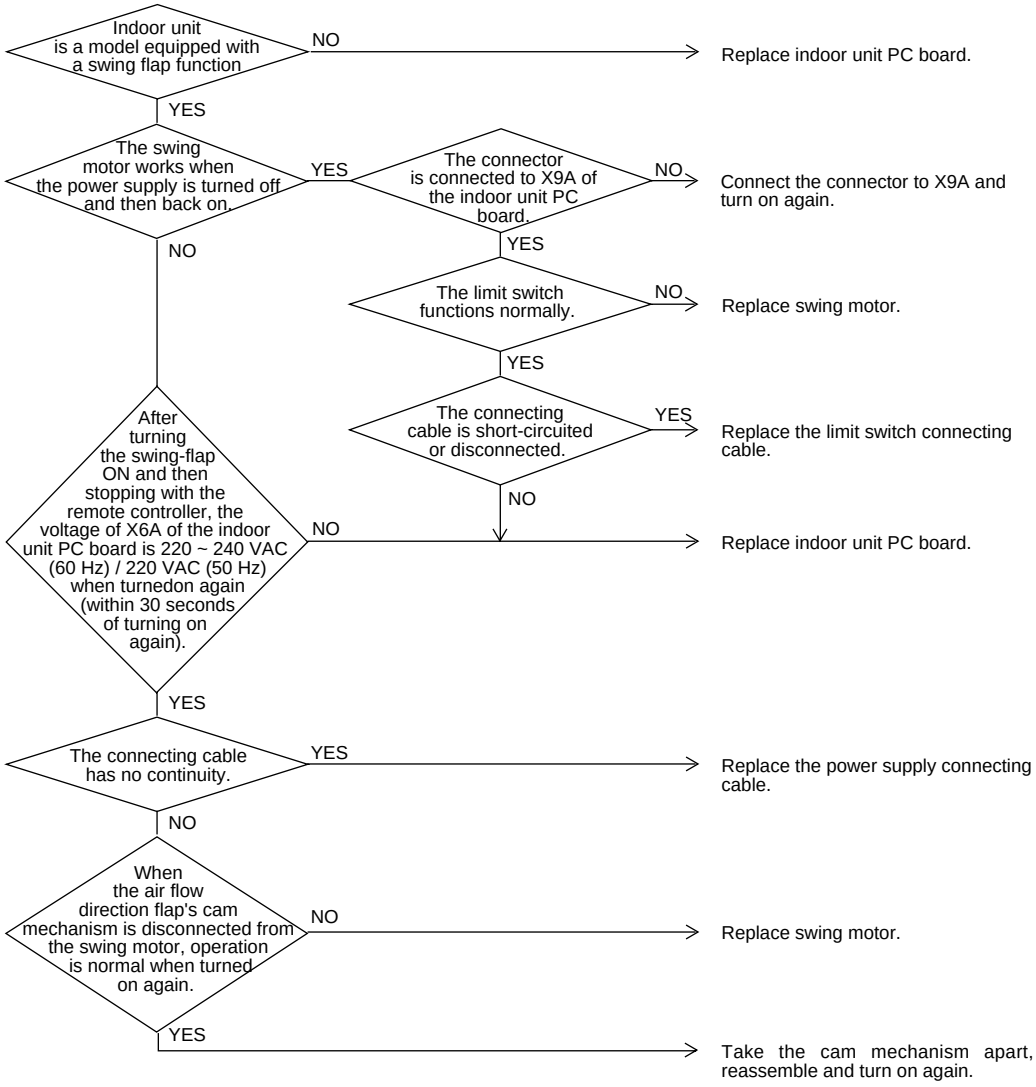
A7

Supposed Causes

- Defect of swing motor
- Defect of connection cable (power supply and limit switch)
- Defect of air flow direction adjusting flap-cam
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Indoor unit is a model equipped with a swing flap function
NO
Replace indoor unit PC board.
YES
The swing motor works when the power supply is turned off and then back on.
YES
The connector is connected to X9A of the indoor unit PC board.
NO
Connect the connector to X9A and turn on again.
YES
NO
The limit switch functions normally.
NO
Replace swing motor.
YES
The connecting cable is short-circuited or disconnected.
YES
Replace the limit switch connecting cable.
NO
After turning the swing-flap ON and then stopping with the remote controller, the voltage of X6A of the indoor unit PC board is 220 ~ 240 VAC (60 Hz) / 220 VAC (50 Hz) when turnedon again (within 30 seconds of turning on again).
NO
Replace indoor unit PC board.
YES
The connecting cable has no continuity.
YES
Replace the power supply connecting cable.
NO
When the air flow direction flap's cam mechanism is disconnected from the swing motor, operation is normal when turned on again.
NO
Replace swing motor.
YES
Take the cam mechanism apart, reassemble and turn on again.

(VF032)

3.6 Indoor Unit: Malfunction of Moving Part of Electronic Expansion Valve (Y1E)

Remote Controller Display

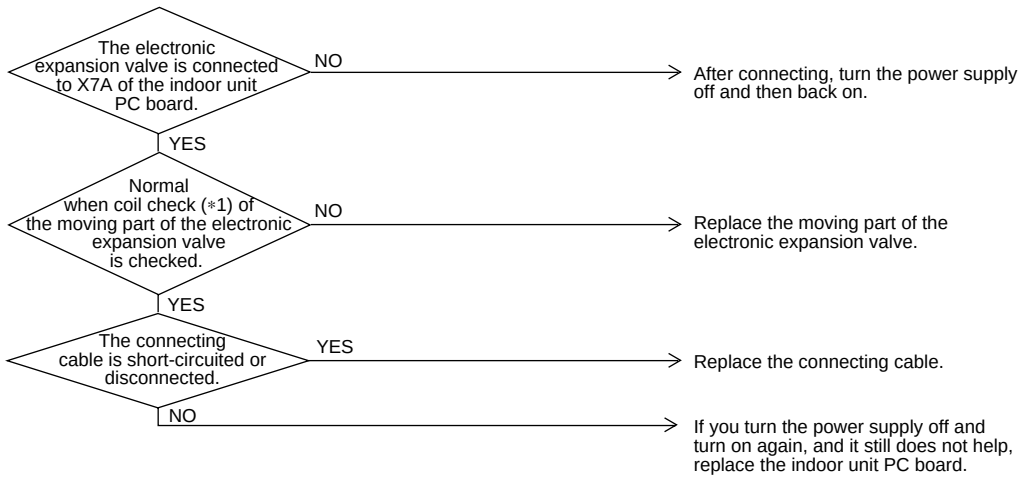
A9

Supposed Causes

- Malfunction of moving part of electronic expansion valve
- Defect of indoor unit PC board
- Defect of connecting cable

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The electronic expansion valve is connected to X7A of the indoor unit PC board.
NO
After connecting, turn the power supply off and then back on.
YES
Normal when coil check (*1) of the moving part of the electronic expansion valve is checked.
NO
Replace the moving part of the electronic expansion valve.
YES
The connecting cable is short-circuited or disconnected.
YES
Replace the connecting cable.
NO
If you turn the power supply off and turn on again, and it still does not help, replace the indoor unit PC board.

(VF033)

*1: Coil check method for the moving part of the electronic expansion valve.
Disconnect electronic expansion valve from P.C.B, then check the continuity between connector pins and judge.

(Normal)

Pin No.	1. White	2. Yellow	3. Orange	4. Blue	5. Red	6. Brown
1. White		×	○ Approx. 300Ω	×	○ Approx. 150Ω	×
2. Yellow			×	○ Approx. 300Ω	×	○ Approx. 150Ω
3. Orange				×	○ Approx. 150Ω	×
4. Blue					×	○ Approx. 150Ω
5. Red						×
6. Brown						

○: Continuity
×: No continuity

3.7 Indoor Unit: Drain Level above Limit

Remote Controller Display

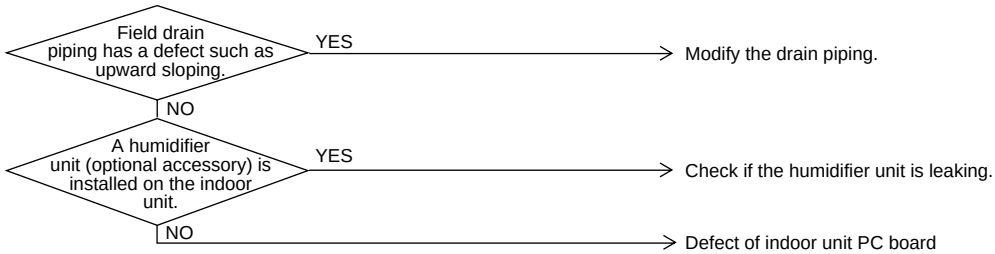
AF

Supposed Causes

- Humidifier unit (optional accessory) leaking
- Defect of drain pipe (upward slope, etc.)
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Field drain piping has a defect such as upward sloping.
YES
Modify the drain piping.
NO
A humidifier unit (optional accessory) is installed on the indoor unit.
YES
Check if the humidifier unit is leaking.
NO
Defect of indoor unit PC board

(VF034)

3.8 Indoor Unit: Malfunction of Capacity Determination Device

Remote controller display

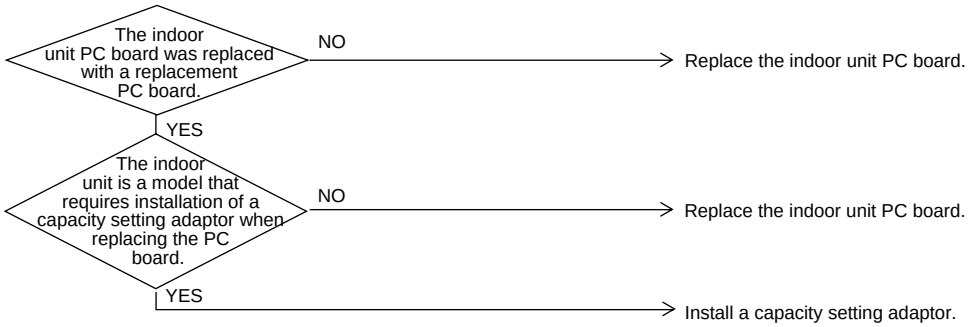
AJ

Supposed Causes

- You have forgotten to install the capacity setting adaptor.
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The indoor unit PC board was replaced with a replacement PC board.
NO
Replace the indoor unit PC board.
YES
The indoor unit is a model that requires installation of a capacity setting adaptor when replacing the PC board.
NO
Replace the indoor unit PC board.
YES
Install a capacity setting adaptor.

(VF035)

3.9 Indoor Unit: Malfunction of Thermistor (R2T) for Liquid Pipe

Remote Controller Display

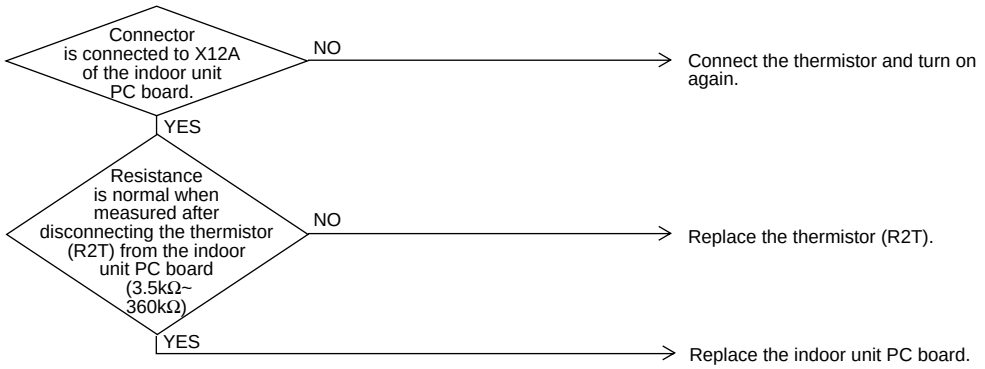
C4

Supposed Causes

- Defect of thermistor (R2T) for liquid pipe
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X12A of the indoor unit PC board.
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R2T) from the indoor unit PC board (3.5kΩ~ 360kΩ)
NO
Replace the thermistor (R2T).
YES
Replace the indoor unit PC board.

(VF036)

3.10 Indoor Unit: Malfunction of Thermistor (R3T) for Gas Pipes

Remote Controller Display

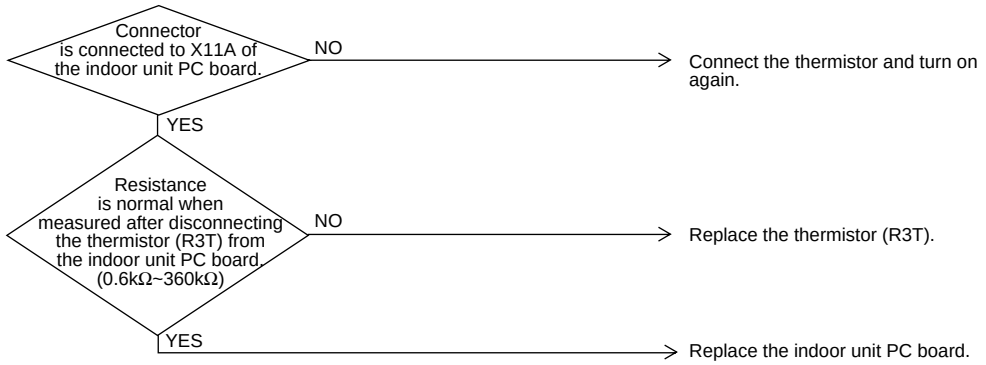
C5

Supposed Causes

- Defect of indoor unit thermistor (R3T) for gas pipe
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X11A of the indoor unit PC board.
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R3T) from the indoor unit PC board. (0.6kΩ~360kΩ)
NO
Replace the thermistor (R3T).
YES
Replace the indoor unit PC board.

(VF037)

3.11 Indoor Unit: Malfunction of Thermistor (R1T) for Air Inlet

Remote Controller Display

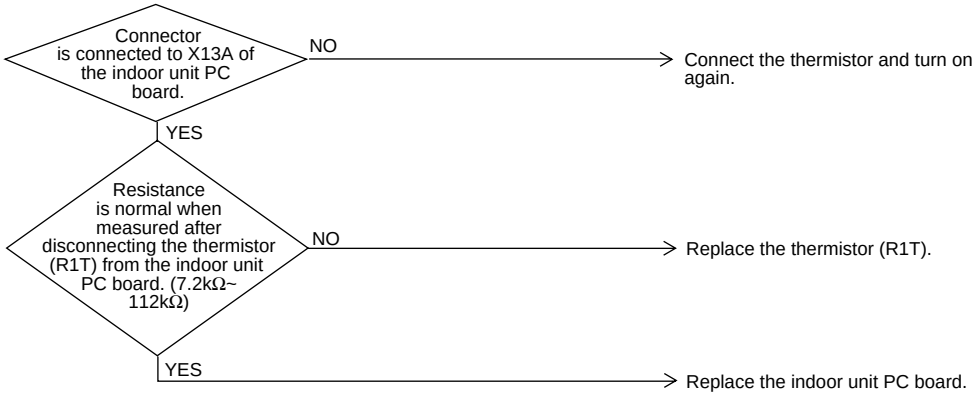
C9

Supposed Causes

- Defect of indoor unit thermistor (R1T) for air inlet
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X13A of the indoor unit PC board.
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R1T) from the indoor unit PC board. (7.2kΩ~ 112kΩ)
NO
Replace the thermistor (R1T).
YES
Replace the indoor unit PC board.

(VF038)

3.12 Indoor Unit: Malfunction of Thermostat Sensor in Remote Controller

Remote Controller Display

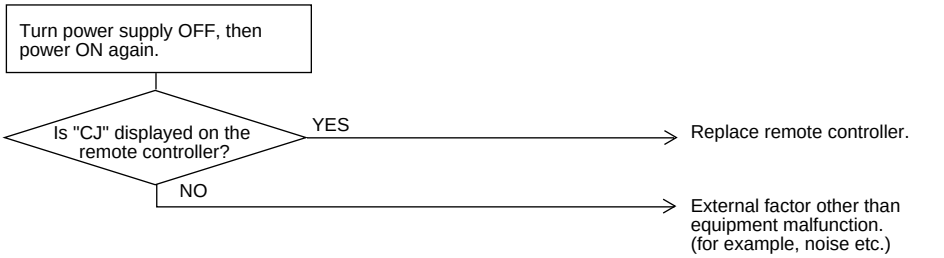
CJ

Supposed Causes

- Defect of remote controller thermistor
- Defect of remote controller PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Turn power supply OFF, then power ON again.
Is "CJ" displayed on the remote controller?
YES
Replace remote controller.
NO
External factor other than equipment malfunction. (for example, noise etc.)

(VF039)

3.13 Outdoor Unit: Actuation of Safety Device

Remote Controller Display

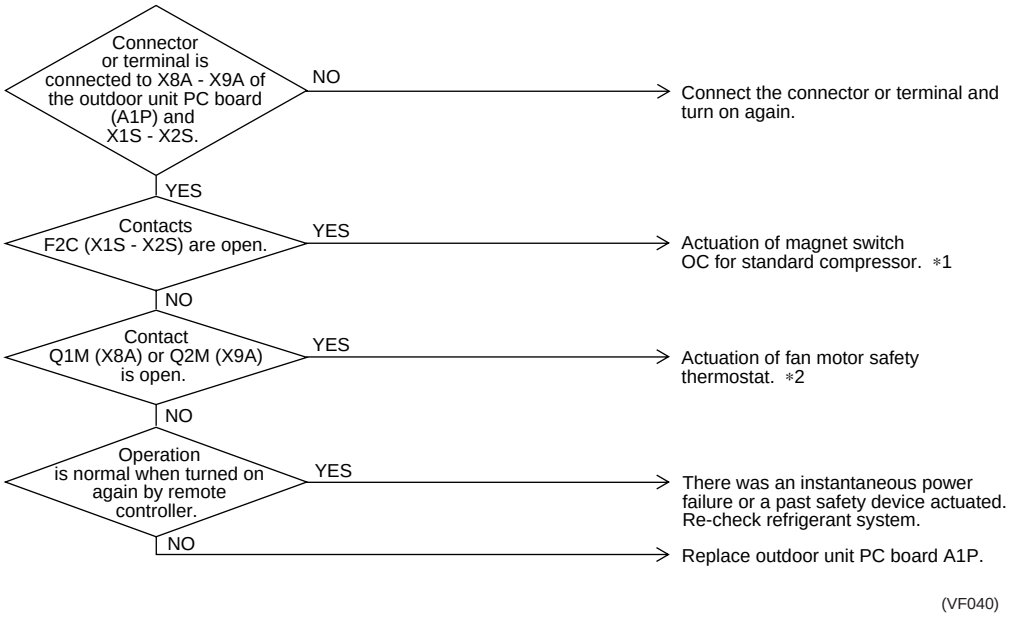
E0

Supposed Causes

- Actuation of outdoor unit safety device
- Defect of outdoor unit PC board
- Instantaneous power failure

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector or terminal is connected to X8A - X9A of the outdoor unit PC board (A1P) and X1S - X2S.
NO
Connect the connector or terminal and turn on again.
YES
Contacts F2C (X1S - X2S) are open.
YES
Actuation of magnet switch OC for standard compressor. ∗1
NO
Contact Q1M (X8A) or Q2M (X9A) is open.
YES
Actuation of fan motor safety thermostat. ∗2
NO
Operation is normal when turned on again by remote controller.
YES
There was an instantaneous power failure or a past safety device actuated. Re-check refrigerant system.
NO
Replace outdoor unit PC board A1P.

(VF040)

∗1: Actuation of magnet switch OC
Defect of compressor
Power supply insufficient
Defect of magnet switch, etc.

∗2: Actuation of fan motor safety thermostat
Defect of fan motor
Defect of capacitor, etc.

3.14 Outdoor Unit: PC Board Defect

Remote Controller Display

E1

Supposed Causes

- Defect of outdoor unit PC board (A1P)

Troubleshooting

Replace outdoor unit PC board A1P.

3.15 Outdoor Unit: Actuation of High Pressure Switch

Remote Controller Display

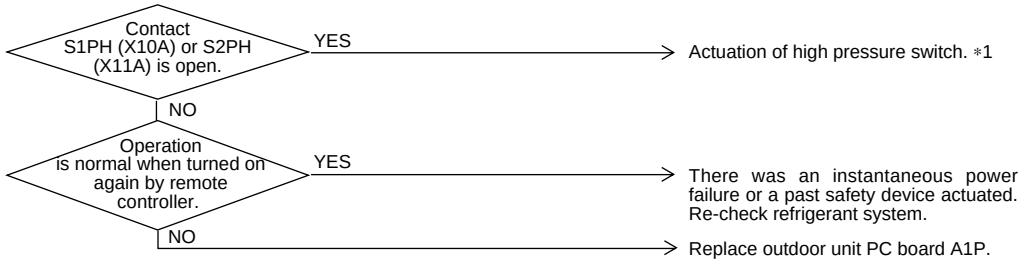
E3

Supposed Causes

- Actuation of outdoor unit high pressure switch
- Defect of outdoor unit PC board (A1P)
- Instantaneous power failure

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Contact S1PH (X10A) or S2PH (X11A) is open.
YES
Actuation of high pressure switch. ∗1
NO
Operation is normal when turned on again by remote controller.
YES
There was an instantaneous power failure or a past safety device actuated. Re-check refrigerant system.
NO
Replace outdoor unit PC board A1P.

(VF041)

∗1: Actuation of high pressure switch (HPS)
The outdoor unit PC board's connector is disconnected.
Is the outdoor unit heat exchanger dirty?
Defect of outdoor fan
Is the refrigerant over-charged?

3.16 Outdoor Unit: Actuation of Low Pressure Switch

Remote Controller Display

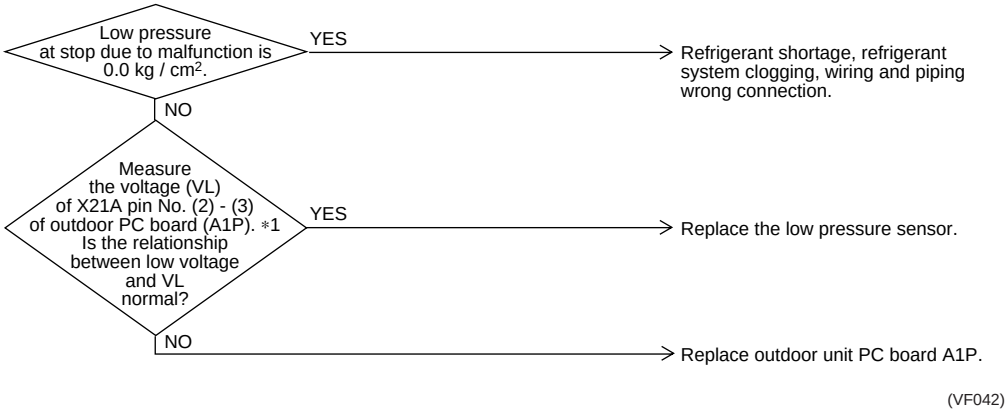
E4

Supposed Causes

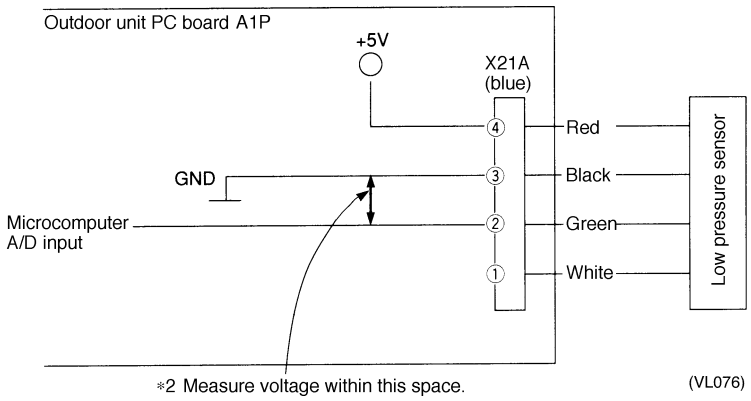
- Abnormal drop of low pressure (0 kg/cm² [0 MPa])
- Defect of low pressure sensor
- Defect of outdoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Low pressure at stop due to malfunction is 0.0 kg / cm².
YES
Refrigerant shortage, refrigerant system clogging, wiring and piping wrong connection.
NO
Measure the voltage (VL) of X21A pin No. (2) - (3) of outdoor PC board (A1P). ∗1 Is the relationship between low voltage and VL normal?
YES
Replace the low pressure sensor.
NO
Replace outdoor unit PC board A1P.
(VF042)

∗1: Voltage measurement point



∗2: Refer to pressure sensor, pressure - voltage characteristics table on P587.

3.17 Outdoor Unit: Malfunction of Moving Part of Electronic Expansion Valve (Y1E)

Remote Controller Display

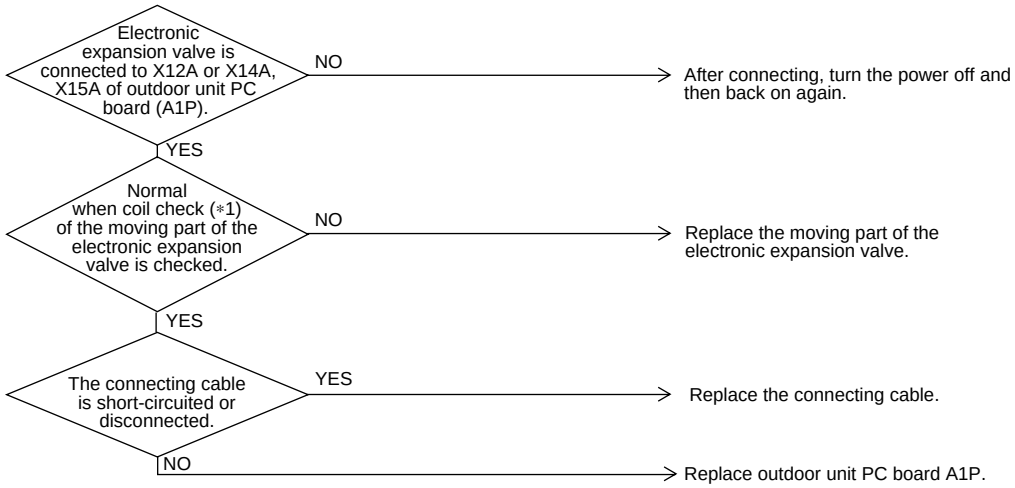
E9

Supposed Causes

- Defect of moving part of electronic expansion valve
- Defect of outdoor unit PC board (A1P)
- Defect of connecting cable

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Electronic expansion valve is connected to X12A or X14A, X15A of outdoor unit PC board (A1P).
NO
After connecting, turn the power off and then back on again.
YES
Normal when coil check (*1) of the moving part of the electronic expansion valve is checked.
NO
Replace the moving part of the electronic expansion valve.
YES
The connecting cable is short-circuited or disconnected.
YES
Replace the connecting cable.
NO
Replace outdoor unit PC board A1P.

(VF043)

*1 Coil check method for the moving part of the electronic expansion valve
Disconnect the electronic expansion valve from the PC board and check the continuity between the connector pins.

(Normal)

Pin No.	1. White	2. Yellow	3. Orange	4. Blue	5. Red	6. Brown
1. White		×	◎	×	○	×
2. Yellow			×	◎	×	○
3. Orange				×	○	×
4. Blue					×	○
5. Red						×
6. Brown						

◎: Continuity Approx. 300Ω
○: Continuity Approx. 150Ω
×: No continuity

Note: MX1R Series...X12A
ME1R Series...X14A, X15A

3.18 Outdoor Unit: Abnormal Discharge Pipe Temperature

Remote Controller Display

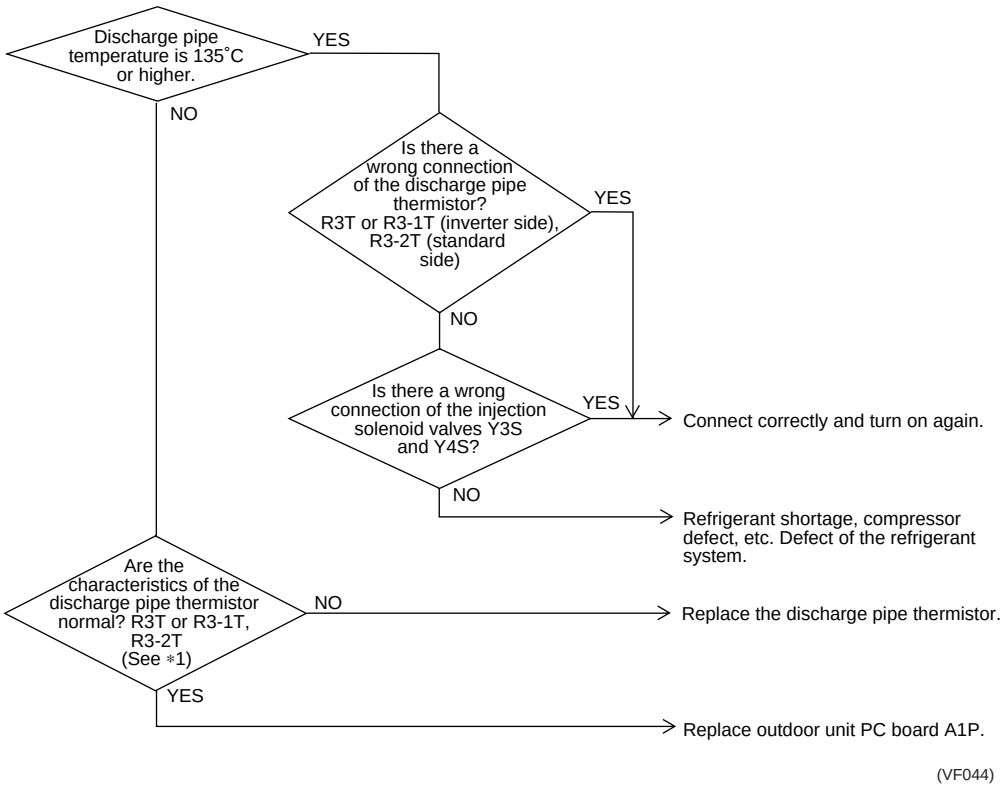
F3

Supposed Causes

- Abnormal discharge pipe temperature
- Defect of discharge pipe thermistor (CU-5:R3T, CU-8·10: R3-1T, R3-2T)
- Defect of outdoor unit PC board
- Discharge pipe thermistor wrong connection
- Liquid injection solenoid valve wrong connection

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Discharge pipe temperature is 135˚C or higher.
YES
NO
Is there a wrong connection of the discharge pipe thermistor? R3T or R3-1T (inverter side), R3-2T (standard side)
YES
NO
Is there a wrong connection of the injection solenoid valves Y3S and Y4S?
YES
Connect correctly and turn on again.
NO
Refrigerant shortage, compressor defect, etc. Defect of the refrigerant system.
Are the characteristics of the discharge pipe thermistor normal? R3T or R3-1T, R3-2T (See ∗1)
NO
Replace the discharge pipe thermistor.
YES
Replace outdoor unit PC board A1P.
(VF044)

∗1 Refer to Thermistor Resistance / Temperature Characteristics on P585

Note:

	CU-5	CU-8·10	
	R3T	R3-1T (inverter)	R3-2T (standard)
MX1R	X17A	X17A	X18A
ME1R	—	X16A	X17A

3.19 Outdoor Unit: Malfunction of Thermistor (R1T) for Outdoor Air

Remote Controller Display

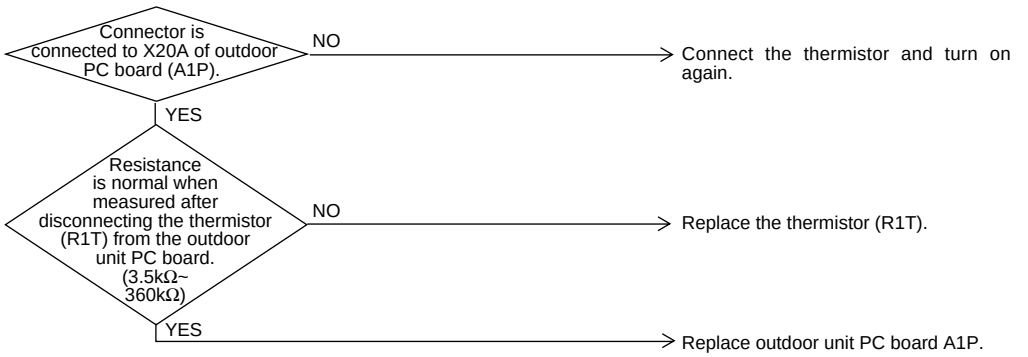
H9

Supposed Causes

- Defect of thermistor (R1T) for outdoor unit outdoor air intake
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X20A of outdoor PC board (A1P).
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R1T) from the outdoor unit PC board. (3.5kΩ~ 360kΩ)
NO
Replace the thermistor (R1T).
YES
Replace outdoor unit PC board A1P.

(VF045)

The alarm indicator is displayed when the fan is being used also.

3.20 Outdoor Unit: Malfunction of Discharge Pipe Thermistor (R3T)

Remote Controller Display

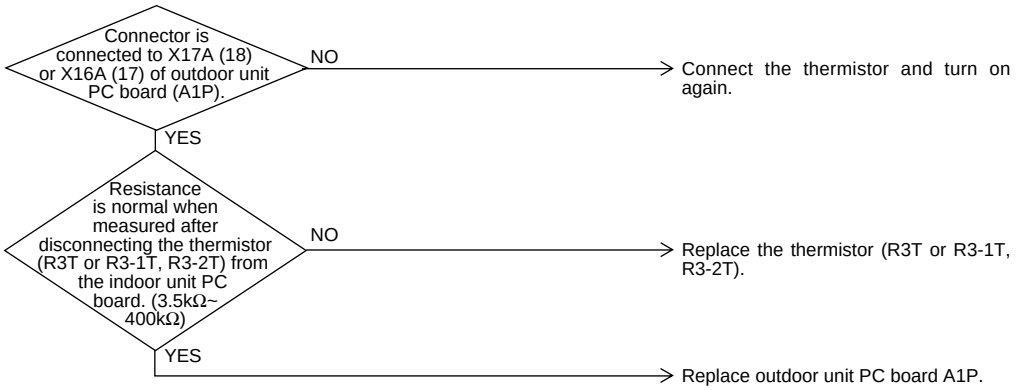
J3

Supposed Causes

- Defect of thermistor (CU-5: R3T, CU-8·10: R3-1T, R3-2T) for outdoor unit discharge pipe
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X17A (18) or X16A (17) of outdoor unit PC board (A1P).
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R3T or R3-1T, R3-2T) from the indoor unit PC board. (3.5kΩ~ 400kΩ)
NO
Replace the thermistor (R3T or R3-1T, R3-2T).
YES
Replace outdoor unit PC board A1P.

(VF046)

The alarm indicator is displayed when the fan is being used also.

Note:

	CU-5	CU-8·10	
	R3T	R3-1T (inverter)	R3-2T (standard)
MX1R	X17A	X17A	X18A
ME1R	—	X16A	X17A

3.21 Outdoor Unit: Malfunction of Thermistor (R4T) for Suction Pipe

Remote Controller Display

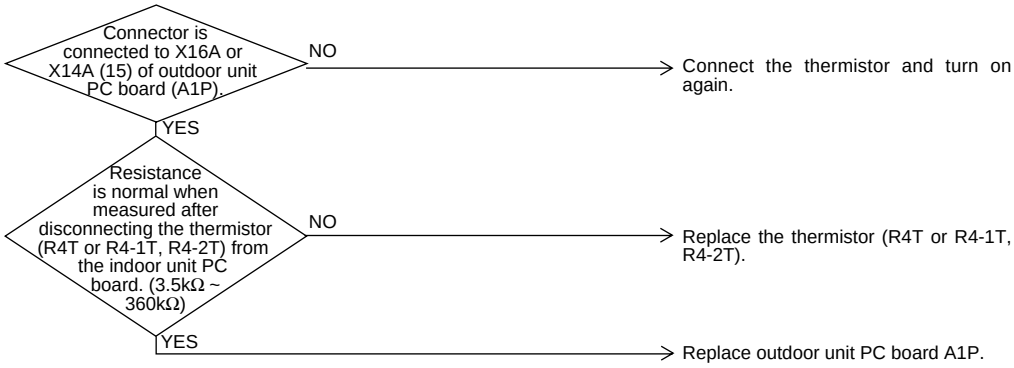
J5

Supposed Causes

- Defect of thermistor (R4T or R4-1T, R4-2T) for outdoor unit suction pipe
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X16A or X14A (15) of outdoor unit PC board (A1P).
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R4T or R4-1T, R4-2T) from the indoor unit PC board. (3.5kΩ ~ 360kΩ)
NO
Replace the thermistor (R4T or R4-1T, R4-2T).
YES
Replace outdoor unit PC board A1P.

(VF047)

The alarm indicator is displayed when the fan is being used also.

Note: MX1R Series
R4T↔X16A

ME1R Series
R4-1T↔X14A
R4-2T↔X15A

3.22 Outdoor Unit: Malfunction of Thermistor (R2T) for Heat Exchanger

Remote Controller Display

J6

Supposed Causes

- Defect of thermistor (R2T or R2-1T, R2-2T) for outdoor unit coil
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

Connector is connected to X19A or X18A (19) of outdoor unit PC board (A1P).
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R2T or R2-1T, R2-2T) from the indoor unit PC board. (3.5kΩ~ 360kΩ)
NO
Replace the thermistor (R2T or R2-1T, R2-2T).
YES
Replace outdoor unit PC board A1P.

(VF048)

The alarm indicator is displayed when the fan is being used also.

Note: MX1R Series
R2T↔X19A

ME1R Series
R2-1T↔X18A
R2-2T↔X19A

3.23 Outdoor Unit: Malfunction of Discharge Pipe Pressure Sensor

Remote Controller Display

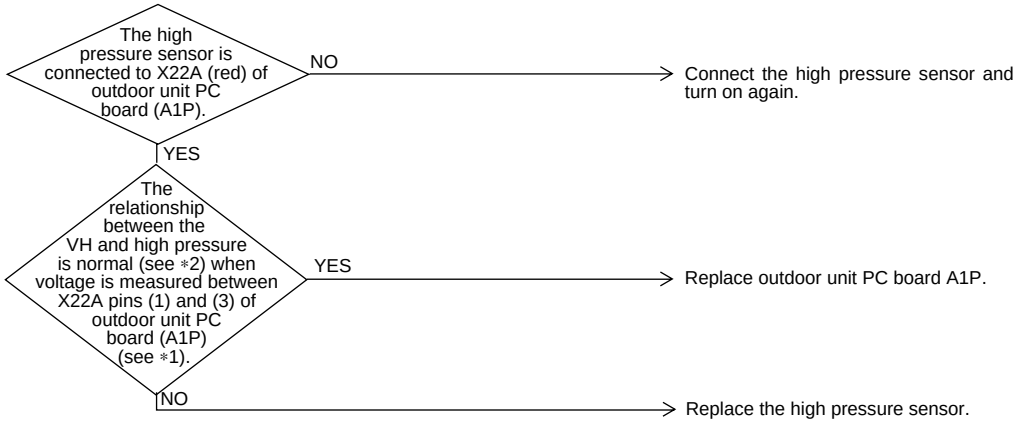
JA

Supposed Causes

- Defect of high pressure sensor system
- Connection of low pressure sensor with wrong connection.
- Defect of outdoor unit PC board.

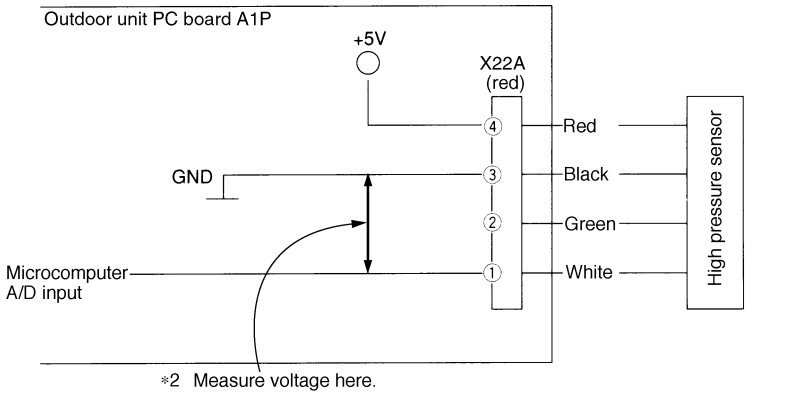
Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The high pressure sensor is connected to X22A (red) of outdoor unit PC board (A1P).
NO
Connect the high pressure sensor and turn on again.
YES
The relationship between the VH and high pressure is normal (see ∗2) when voltage is measured between X22A pins (1) and (3) of outdoor unit PC board (A1P) (see ∗1).
YES
Replace outdoor unit PC board A1P.
NO
Replace the high pressure sensor.

(VF049)

∗1: Voltage measurement point



(VL077)

∗2: Refer to pressure sensor, pressure / voltage characteristics table on P587.

3.24 Outdoor Unit: Malfunction of Suction Pipe Pressure Sensor

Remote Controller Display

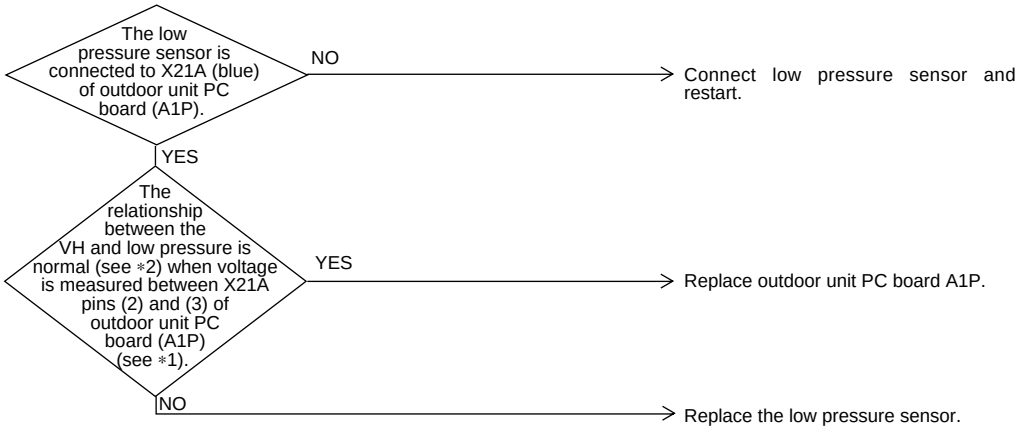
JC

Supposed Causes

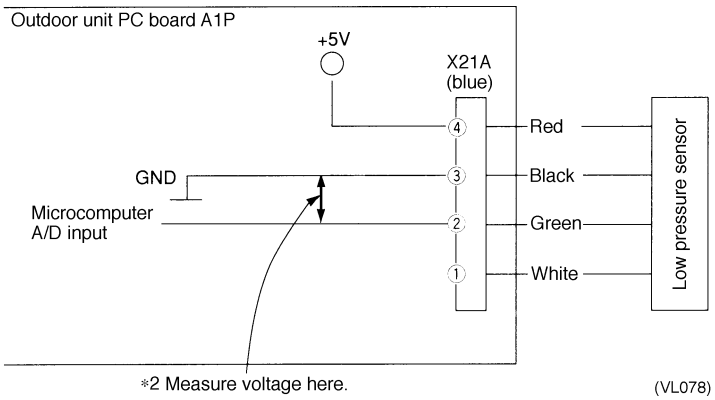
- Defect of low pressure sensor system
- Connection of high pressure sensor with wrong connection.
- Defect of outdoor unit PC board.

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The low pressure sensor is connected to X21A (blue) of outdoor unit PC board (A1P).
NO
Connect low pressure sensor and restart.
YES
The relationship between the VH and low pressure is normal (see ∗2) when voltage is measured between X21A pins (2) and (3) of outdoor unit PC board (A1P) (see ∗1).
YES
Replace outdoor unit PC board A1P.
NO
Replace the low pressure sensor.
(VF050)

∗1: Voltage measurement point



∗2: Refer to pressure sensor, pressure/voltage characteristics table on P587.

3.25 Outdoor Unit: Malfunction of Oil Temperature Thermistor (R5T)

Remote Controller Display

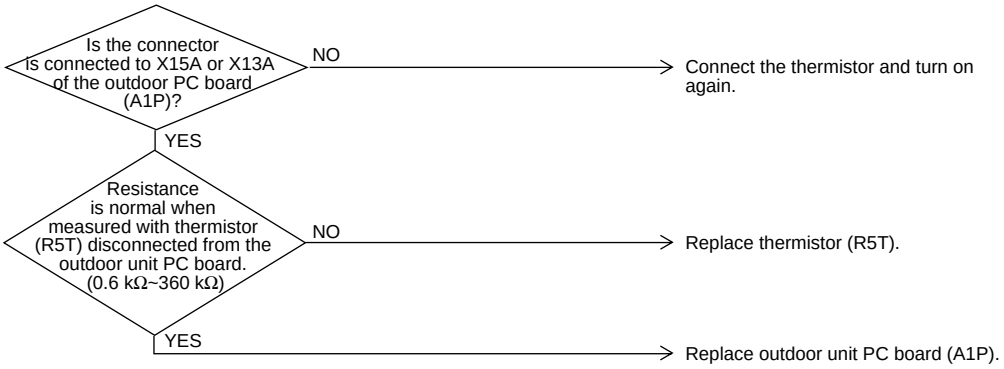
JH

Supposed Causes

- Defect of oil temperature thermistor (R5T)
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is the connector is connected to X15A or X13A of the outdoor PC board (A1P)?
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured with thermistor (R5T) disconnected from the outdoor unit PC board. (0.6 kΩ~360 kΩ)
NO
Replace thermistor (R5T).
YES
Replace outdoor unit PC board (A1P).

(VF051)

Note: MX1R Series
R5T↔X15A

ME1R Series
R5T↔X13A

3.26 Low Pressure Drop Due to Refrigerant Shortage or Electronic Expansion Valve Failure

Remote Controller Display

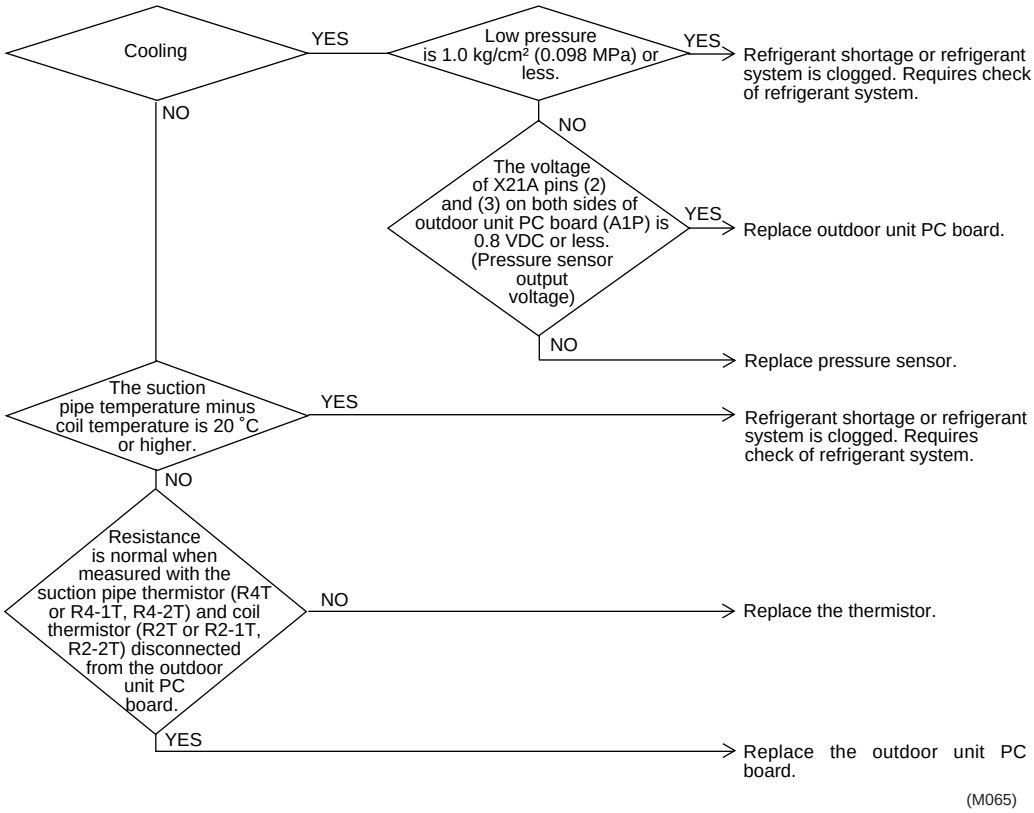
U0

Supposed Causes

- Refrigerant shortage or refrigerant system clogging (incorrect piping)
- Defect of pressure sensor
- Defect of outdoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Cooling
YES
Low pressure is 1.0 kg/cm² (0.098 MPa) or less.
YES
Refrigerant shortage or refrigerant system is clogged. Requires check of refrigerant system.
NO
NO
The voltage of X21A pins (2) and (3) on both sides of outdoor unit PC board (A1P) is 0.8 VDC or less. (Pressure sensor output voltage)
YES
Replace outdoor unit PC board.
NO
Replace pressure sensor.
The suction pipe temperature minus coil temperature is 20 °C or higher.
YES
Refrigerant shortage or refrigerant system is clogged. Requires check of refrigerant system.
NO
Resistance is normal when measured with the suction pipe thermistor (R4T or R4-1T, R4-2T) and coil thermistor (R2T or R2-1T, R2-2T) disconnected from the outdoor unit PC board.
NO
Replace the thermistor.
YES
Replace the outdoor unit PC board.

(M065)

3.27 Negative Phase, Open Phase

Remote Controller Display

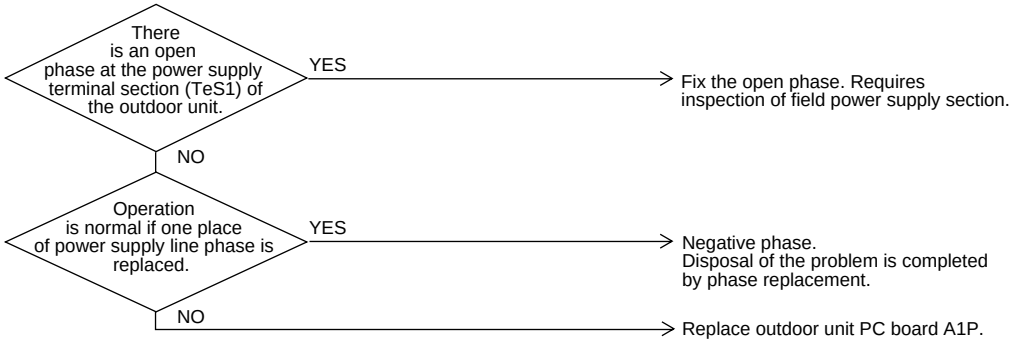
U1

Supposed Causes

- Power supply negative phase
- Power supply open phase
- Defect of outdoor PC board A1P

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


There is an open phase at the power supply terminal section (TeS1) of the outdoor unit.
YES
Fix the open phase. Requires inspection of field power supply section.
NO
Operation is normal if one place of power supply line phase is replaced.
YES
Negative phase. Disposal of the problem is completed by phase replacement.
NO
Replace outdoor unit PC board A1P.

(VF053)

3.28 Malfunction of Transmission Between Indoor Units

Remote Controller Display

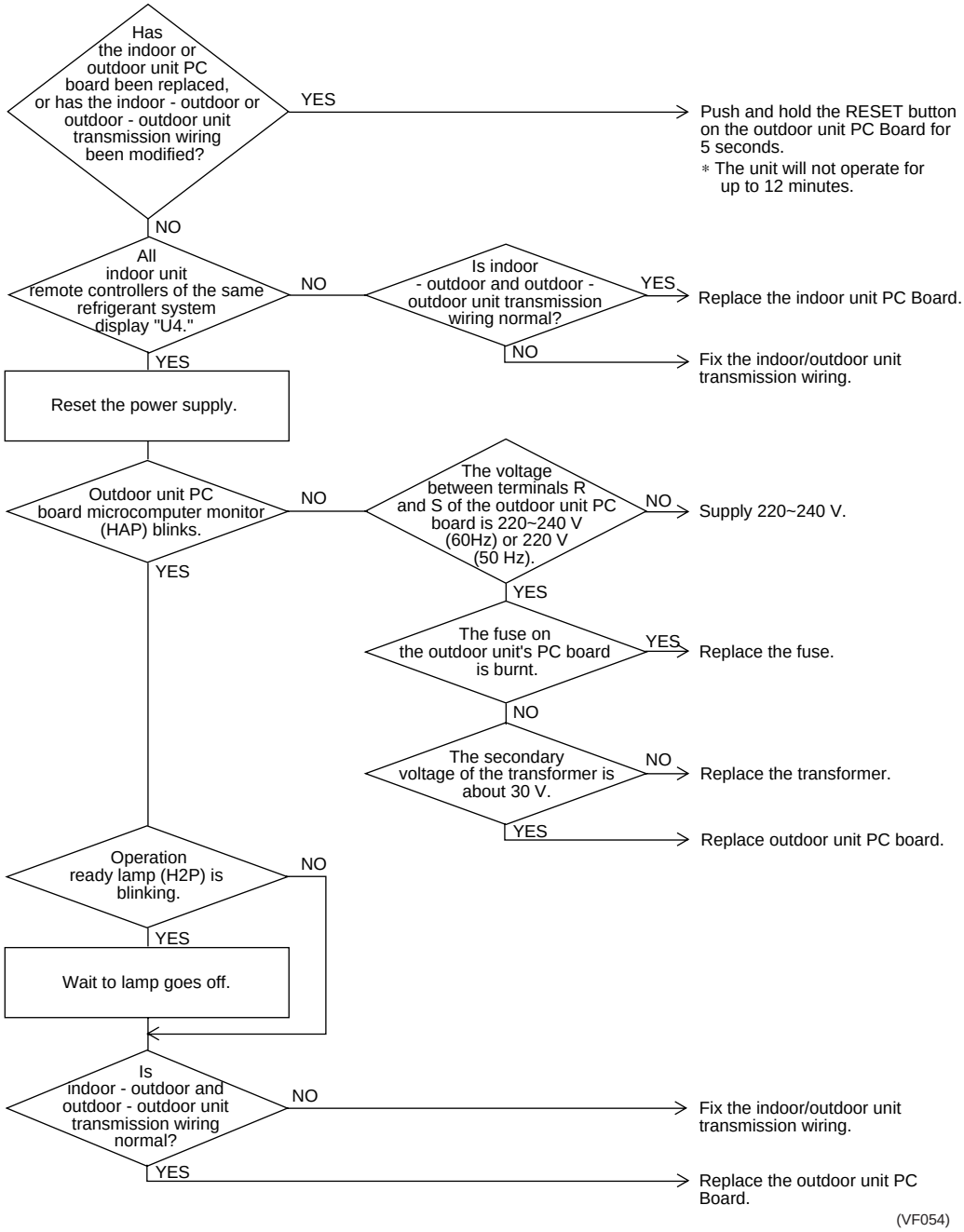
U4

Supposed Causes

- Indoor to outdoor,outdoor to outdoor crossover wiring, disconnection or short circuit
- Outdoor unit power supply is OFF
- System address doesn't match
- Defect of indoor unit PC board
- Defect of outdoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Has the indoor or outdoor unit PC board been replaced, or has the indoor - outdoor or outdoor - outdoor unit transmission wiring been modified?
YES
Push and hold the RESET button on the outdoor unit PC Board for 5 seconds.
* The unit will not operate for up to 12 minutes.
NO
All indoor unit remote controllers of the same refrigerant system display "U4."
NO
Is indoor - outdoor and outdoor - outdoor unit transmission wiring normal?
YES
Replace the indoor unit PC Board.
NO
Fix the indoor/outdoor unit transmission wiring.
YES
Reset the power supply.
Outdoor unit PC board microcomputer monitor (HAP) blinks.
NO
The voltage between terminals R and S of the outdoor unit PC board is 220~240 V (60Hz) or 220 V (50 Hz).
NO
Supply 220~240 V.
YES
YES
The fuse on the outdoor unit's PC board is burnt.
YES
Replace the fuse.
NO
The secondary voltage of the transformer is about 30 V.
NO
Replace the transformer.
YES
Replace outdoor unit PC board.
Operation ready lamp (H2P) is blinking.
NO
YES
Wait to lamp goes off.
Is indoor - outdoor and outdoor - outdoor unit transmission wiring normal?
NO
Fix the indoor/outdoor unit transmission wiring.
YES
Replace the outdoor unit PC Board.

(VF054)

3.29 Malfunction of Transmission Between Remote Controller and Indoor Unit

Remote Controller Display

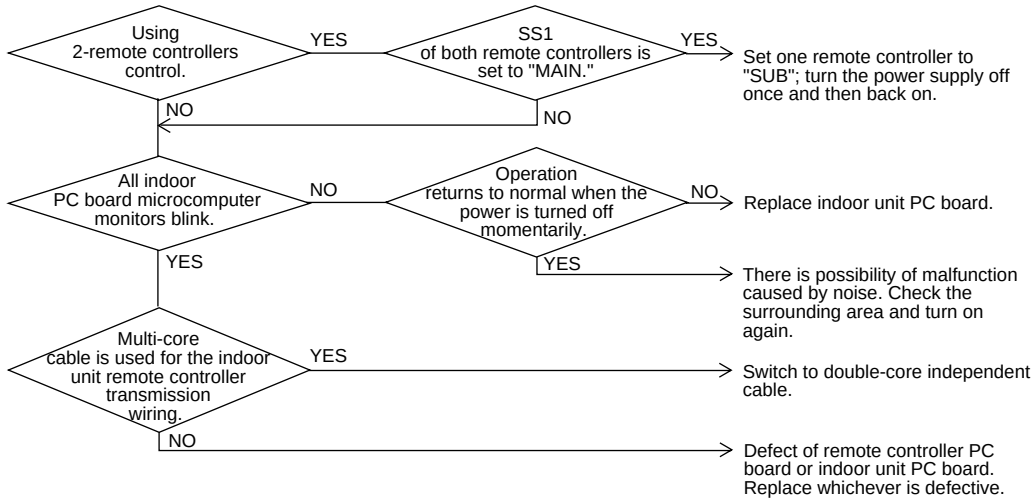
U5

Supposed Causes

- Malfunction of indoor unit remote controller transmission
- Connection of two “main” remote controllers (when using 2 remote controllers)
- Defect of indoor unit PC board
- Defect of remote controller PC board
- Malfunction of transmission caused by noise

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Using 2-remote controllers control.
YES
SS1 of both remote controllers is set to "MAIN."
YES
Set one remote controller to "SUB"; turn the power supply off once and then back on.
NO
NO
All indoor PC board microcomputer monitors blink.
NO
Operation returns to normal when the power is turned off momentarily.
NO
Replace indoor unit PC board.
YES
YES
There is possibility of malfunction caused by noise. Check the surrounding area and turn on again.
Multi-core cable is used for the indoor unit remote controller transmission wiring.
YES
Switch to double-core independent cable.
NO
Defect of remote controller PC board or indoor unit PC board. Replace whichever is defective.

(VF055)

3.30 Malfunction of Transmission Between Outdoor Units

Remote Controller Display

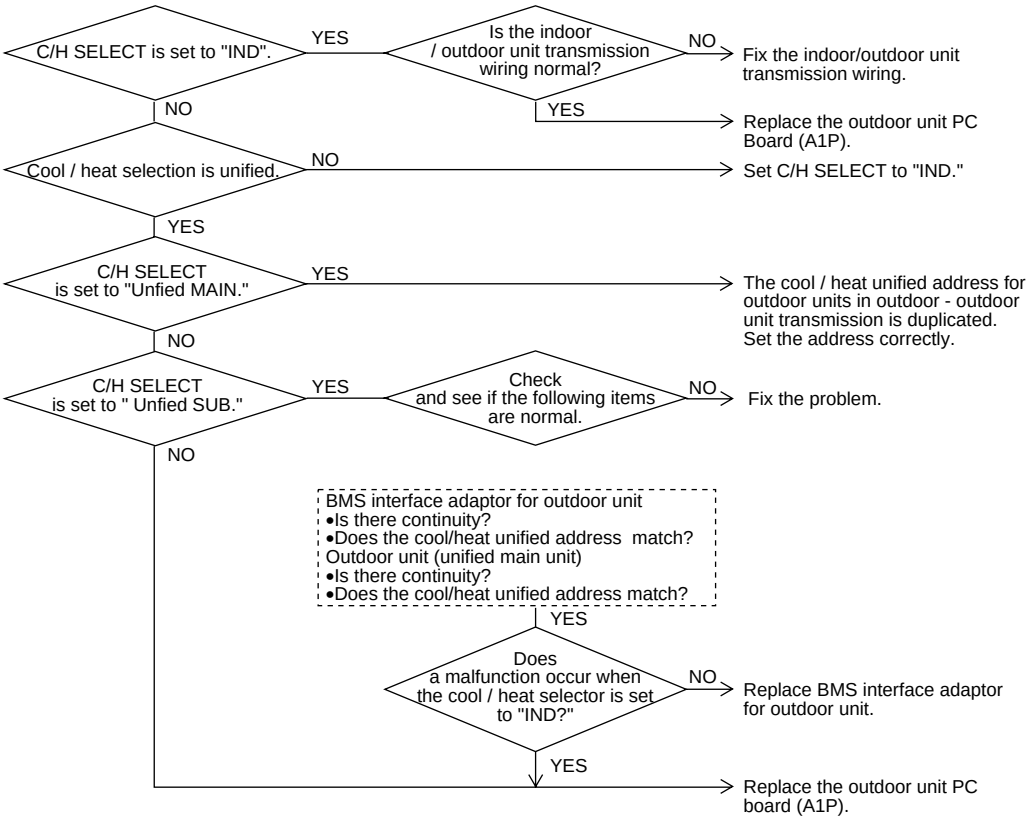
U7

Supposed Causes

- Improper connection of transmission wiring between outdoor unit and BMS interface adaptor for outdoor unit
- Improper cool/heat selection
- Improper cool/heat unified address (outdoor unit, BMS interface adaptor for outdoor unit)
- Defect of outdoor unit PC board (A1P)
- Defect of BMS interface adaptor for outdoor unit (option)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


C/H SELECT is set to "IND".
YES
Is the indoor / outdoor unit transmission wiring normal?
NO
Fix the indoor/outdoor unit transmission wiring.
YES
Replace the outdoor unit PC Board (A1P).
NO
Cool / heat selection is unified.
NO
Set C/H SELECT to "IND."
YES
C/H SELECT is set to "Unfied MAIN."
YES
The cool / heat unified address for outdoor units in outdoor - outdoor unit transmission is duplicated. Set the address correctly.
NO
C/H SELECT is set to " Unfied SUB."
YES
Check and see if the following items are normal.
NO
Fix the problem.
NO
BMS interface adaptor for outdoor unit
•Is there continuity?
•Does the cool/heat unified address match?
Outdoor unit (unified main unit)
•Is there continuity?
•Does the cool/heat unified address match?
YES
Does a malfunction occur when the cool / heat selector is set to "IND?"
NO
Replace BMS interface adaptor for outdoor unit.
YES
Replace the outdoor unit PC board (A1P).

(VF056)

3.31 Malfunction of Transmission Between Master and Slave Remote Controllers

Remote Controller Display

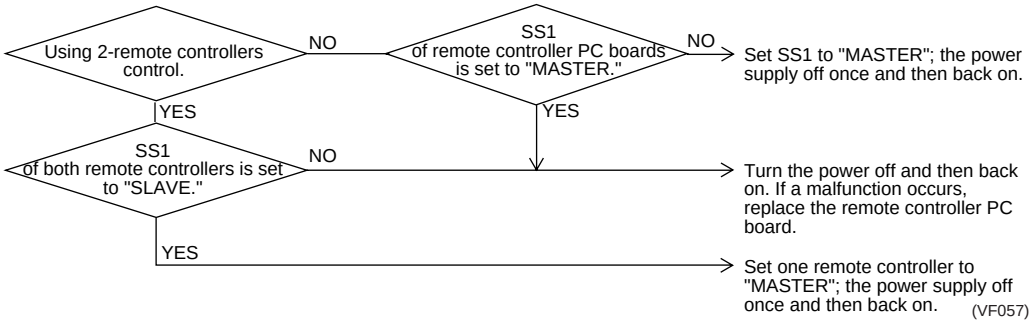
U8

Supposed Causes

- Malfunction of transmission between main and sub remote controller
- Connection between sub remote controllers
- Defect of remote controller PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Using 2-remote controllers control.
NO
SS1 of remote controller PC boards is set to "MASTER."
NO
Set SS1 to "MASTER"; the power supply off once and then back on.
YES
YES
SS1 of both remote controllers is set to "SLAVE."
NO
Turn the power off and then back on. If a malfunction occurs, replace the remote controller PC board.
YES
Set one remote controller to "MASTER"; the power supply off once and then back on.
(VF057)

3.32 Malfunction of Transmission Between Indoor and Outdoor Units in the Same System

Remote Controller Display

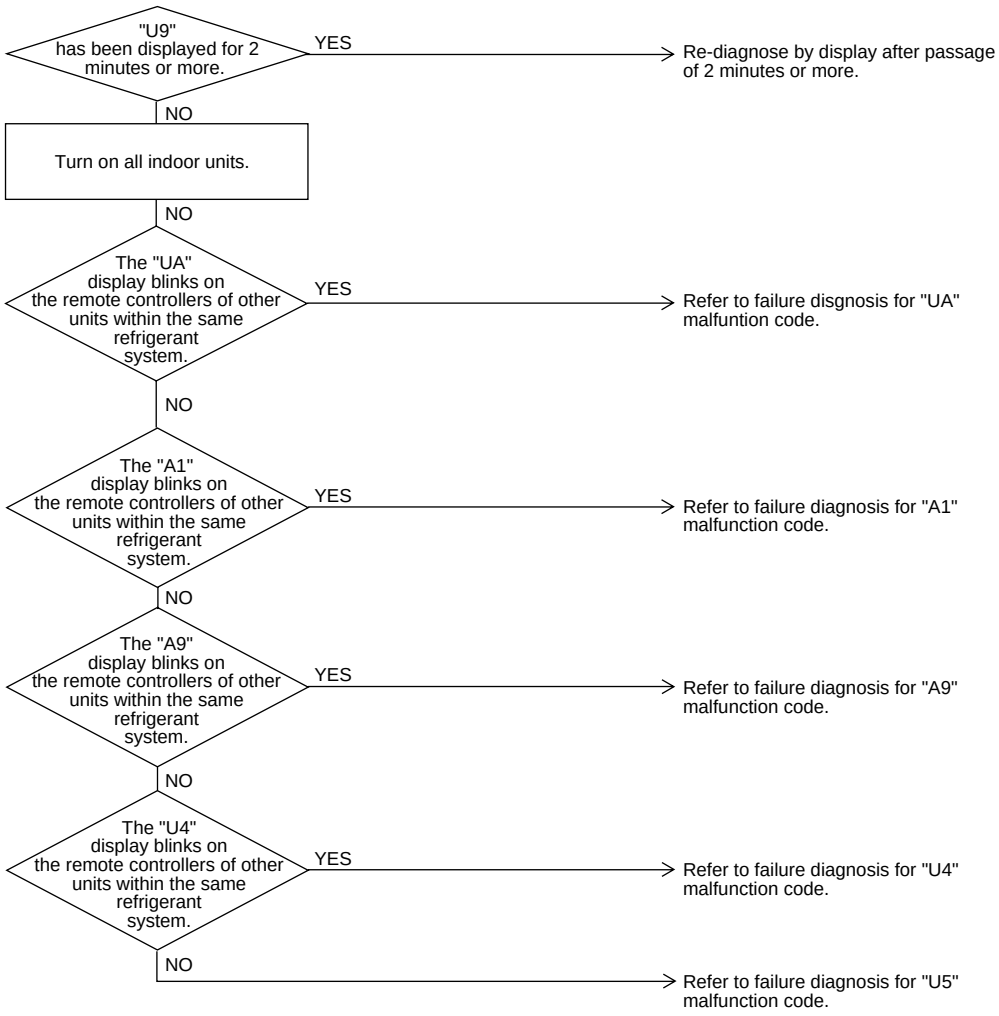
U9

Supposed Causes

- Malfunction of transmission between indoor and outdoor of other system
- Malfunction of electronic expansion valve in indoor unit of other system
- Defect of PC board of indoor unit in other system
- Improper connection of transmission wiring between indoor and outdoor unit

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


"U9" has been displayed for 2 minutes or more.
YES
Re-diagnose by display after passage of 2 minutes or more.
NO
Turn on all indoor units.
NO
The "UA" display blinks on the remote controllers of other units within the same refrigerant system.
YES
Refer to failure disgnosis for "UA" malfuntion code.
NO
The "A1" display blinks on the remote controllers of other units within the same refrigerant system.
YES
Refer to failure diagnosis for "A1" malfunction code.
NO
The "A9" display blinks on the remote controllers of other units within the same refrigerant system.
YES
Refer to failure diagnosis for "A9" malfunction code.
NO
The "U4" display blinks on the remote controllers of other units within the same refrigerant system.
YES
Refer to failure diagnosis for "U4" malfunction code.
NO
Refer to failure diagnosis for "U5" malfunction code.

(VF058)

3.33 Excessive Number of Indoor Units

Remote Controller Display

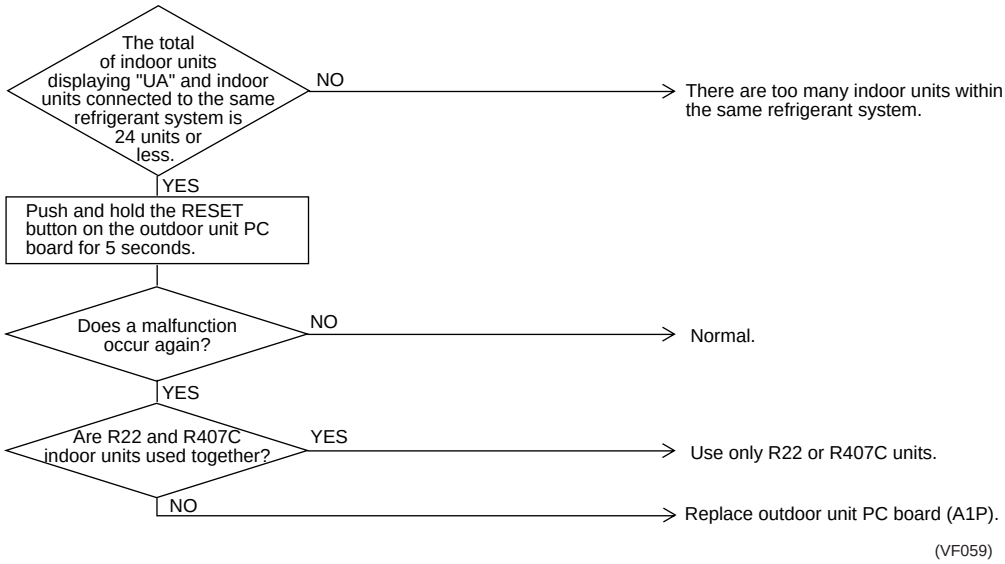
UA

Supposed Causes

- Excess of connected indoor units
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The total of indoor units displaying "UA" and indoor units connected to the same refrigerant system is 24 units or less.
NO
There are too many indoor units within the same refrigerant system.
YES
Push and hold the RESET button on the outdoor unit PC board for 5 seconds.
Does a malfunction occur again?
NO
Normal.
YES
Are R22 and R407C indoor units used together?
YES
Use only R22 or R407C units.
NO
Replace outdoor unit PC board (A1P).
(VF059)

The number of indoor units that can be connected to a single outdoor unit system depends on the model of outdoor unit.

CU-5MX : Max. 8 units
CU-8MX : Max. 13 units
CU-10MX : Max. 16 units
CU-8ME : Max. 13 units
CU-10ME : Max. 16 units

3.34 Address Duplication of Central Remote Controller

Remote Controller Display

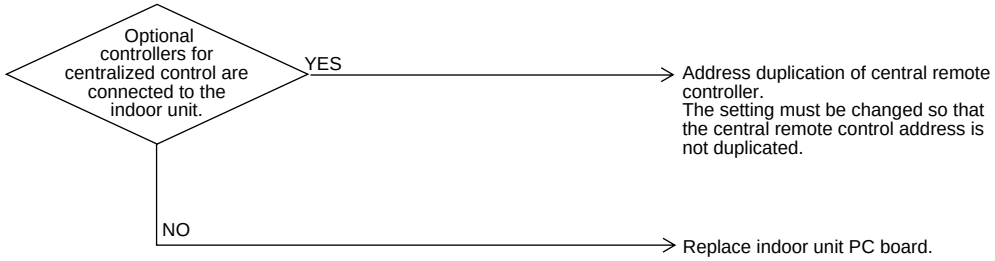
UC

Supposed Causes

- Address duplication of central remote controller
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Optional controllers for centralized control are connected to the indoor unit.
YES
Address duplication of central remote controller.
The setting must be changed so that the central remote control address is not duplicated.
NO
Replace indoor unit PC board.

(VF060)

3.35 Refrigerant System not set, Incompatible Wiring/Piping

Remote Controller Display

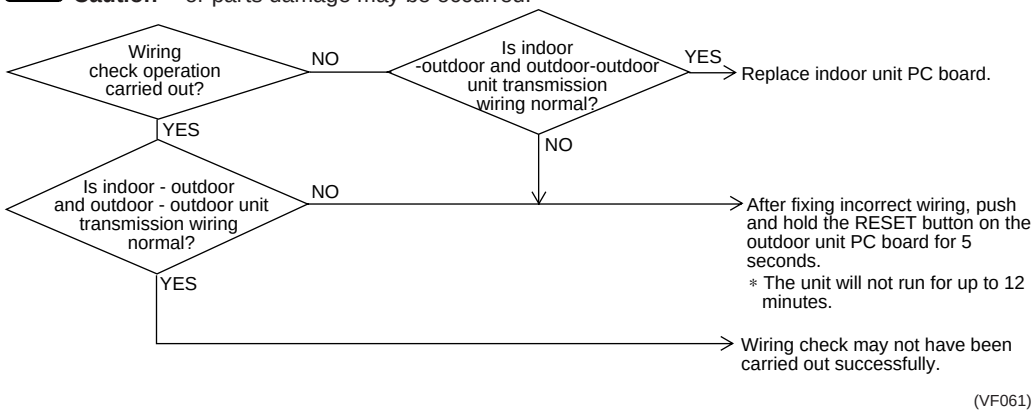
UF

Supposed Causes

- Improper connection of transmission wiring between indoor-outdoor unit and outdoor-outdoor unit
- Failure to execute wiring check operation
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Wiring check operation carried out?
NO
Is indoor -outdoor and outdoor-outdoor unit transmission wiring normal?
YES
Replace indoor unit PC board.
YES
NO
Is indoor - outdoor and outdoor - outdoor unit transmission wiring normal?
NO
After fixing incorrect wiring, push and hold the RESET button on the outdoor unit PC board for 5 seconds.
* The unit will not run for up to 12 minutes.
YES
Wiring check may not have been carried out successfully.
(VF061)

Wiring check may not be successful if carried out after the outdoor unit has been off for more than 12 hours, or if it is not carried out after running all connected indoor units in the fan mode for at least an hour.

3.36 Malfunction of System, Refrigerant System Address Undefined

Remote Controller Display

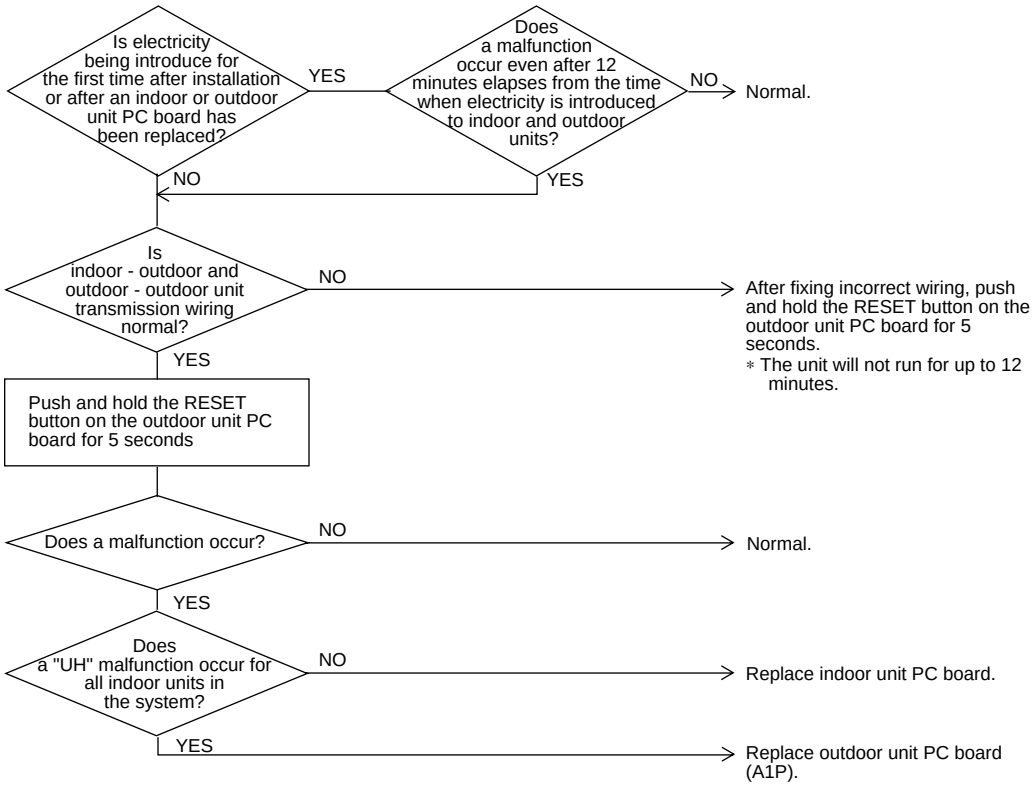
UH

Supposed Causes

- Improper connection of transmission wiring between indoor-outdoor unit and outdoor-outdoor unit
- Defect of indoor unit PC board
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is electricity being introduce for the first time after installation or after an indoor or outdoor unit PC board has been replaced?
YES
Does a malfunction occur even after 12 minutes elapses from the time when electricity is introduced to indoor and outdoor units?
NO
Normal.
NO
YES
Is indoor - outdoor and outdoor - outdoor unit transmission wiring normal?
NO
After fixing incorrect wiring, push and hold the RESET button on the outdoor unit PC board for 5 seconds.
∗ The unit will not run for up to 12 minutes.
YES
Push and hold the RESET button on the outdoor unit PC board for 5 seconds
Does a malfunction occur?
NO
Normal.
YES
Does a "UH" malfunction occur for all indoor units in the system?
NO
Replace indoor unit PC board.
YES
Replace outdoor unit PC board (A1P).

(VF062)

4. Failure Diagnosis for Inverter System

4.1 Points of Diagnosis

The main causes for each malfunction code are given in the table below. (For details refer to the next page and those following.)

◎ : Failure is probable
○ : Failure is possible
□ : Failure is improbable
— : Failure is impossible

Malfunction code	Contents of malfunction	Location of failure							Point of diagnosis
		Inverter		Compressor	Refrigerant system	Outdoor unit PC board	Other	Field cause	
		PC board power unit	Other						
L4	Radiator fin temperature rise	□	◎	—	—	—	—	□	Is the intake port of the radiator fin clogged?
L5	Instantaneous over-current	○	—	◎	□	—	—	—	Inspect the compressor.
L8	Electronic thermal	□	—	◎	○	—	—	—	Inspection the compressor and refrigerant system.
L9	Stall prevention	□	—	○	◎	—	—	—	Inspection the compressor and refrigerant system.
LC	Malfunction of transmission between inverter PC board and outdoor unit PC board	○	◎	—	—	□	—	—	Inspect the connection between the inverter PC board and outdoor unit PC board. Next, inspect the inverter PC board.
U2	Abnormal current/ voltage	○	○	—	—	—	□	◎	• Inspect the fuse on the inverter PC board. • Check the DC voltage.
P1	Over-ripple protection	○	○	—	—	—	—	○	• Open phase • Current/voltage imbalance • Defect of main circuit wiring
P4	Defect of radiator fin temperature sensor	○	□	—	—	—	—	—	Inspect the radiator fin thermistor.

4.2 How to use the Monitor Switch on the Inverter PC Board

The monitor lets you know the contents of the latest stop due to malfunction by LED display on the inverter PC Board. The inverter is equipped with a retry function that retries operation each time stop due to malfunction occurs, and malfunction is therefore not ascertained by merely entering the five minutes standby while retry is attempted the prescribed number of times. If the number of retry times is exceeded within 60 minutes, malfunction is ascertained, and the corresponding malfunction code is displayed on the indoor unit remote controller.

LED	A	1	2	3	4	Malfunction contents	Retry times
	◑	●	●	●	●	Normal	
	◑	●	●	●	○	Malfunction of fin thermistor	3
	◑	○	○	●	●	Sensor malfunction	0
	◑	○	●	●	○	Insufficient voltage	3
	◑	●	●	○	●	Instantaneous over-current	3
	◑	●	○	○	○	Electronic thermal	3
	◑	○	○	○	○	Stall prevention	3
	◑	●	○	●	●	Open phase detection	3
	●	●	●	●	●	Malfunction of microcomputer	Unlimited

◑ : Blink
○ : On
● : Off

5. Troubleshooting (Inverter)

5.1 Outdoor Unit: Malfunction of Inverter Radiating Fin Temperature Rise

Remote Controller Display

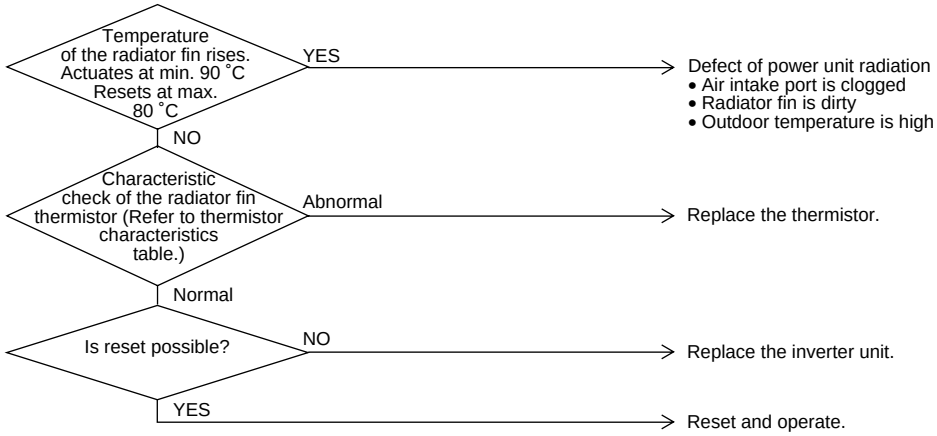
L4

Supposed Causes

- Actuation of fin thermal (Actuates at min. 90°C and resets at max. 80°C)
- Defect of inverter PC board
- Defect of fin thermistor

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Temperature of the radiator fin rises. Actuates at min. 90 ˚C Resets at max. 80 ˚C
YES
Defect of power unit radiation
• Air intake port is clogged
• Radiator fin is dirty
• Outdoor temperature is high
NO
Characteristic check of the radiator fin thermistor (Refer to thermistor characteristics table.)
Abnormal
Replace the thermistor.
Normal
Is reset possible?
NO
Replace the inverter unit.
YES
Reset and operate.

(VF063)

5.2 Outdoor Unit: Inverter Instantaneous Over-Current

Remote Controller Display

L5

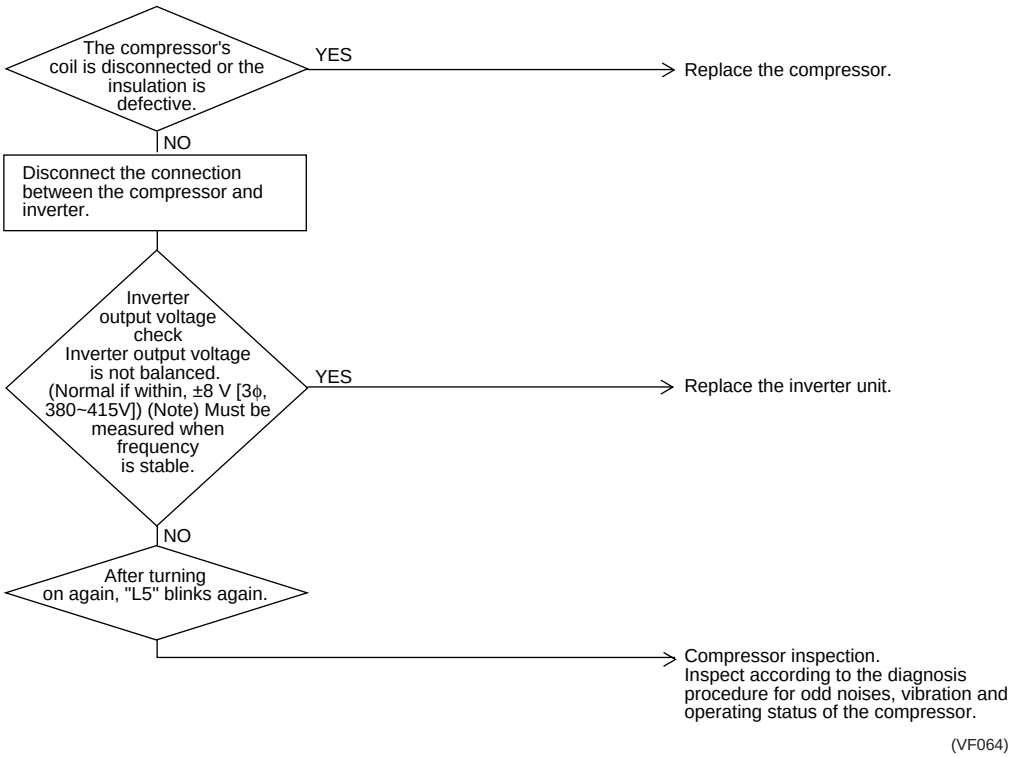
Supposed Causes

- Defect of compressor coil (disconnected, defective insulation)
- Compressor start-up malfunction (mechanical lock)
- Defect of inverter unit

Troubleshooting

Compressor inspection

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The compressor's coil is disconnected or the insulation is defective.
YES
Replace the compressor.
NO
Disconnect the connection between the compressor and inverter.
Inverter output voltage check Inverter output voltage is not balanced. (Normal if within, ±8 V [3ϕ, 380~415V]) (Note) Must be measured when frequency is stable.
YES
Replace the inverter unit.
NO
After turning on again, "L5" blinks again.
Compressor inspection. Inspect according to the diagnosis procedure for odd noises, vibration and operating status of the compressor.
(VF064)

∗ If inverter output voltage is measured by tester, the displayed voltage is higher than actual voltage.

5.3 Outdoor Unit: Inverter Thermostat Sensor, Compressor Overload

Remote Controller Display

L8

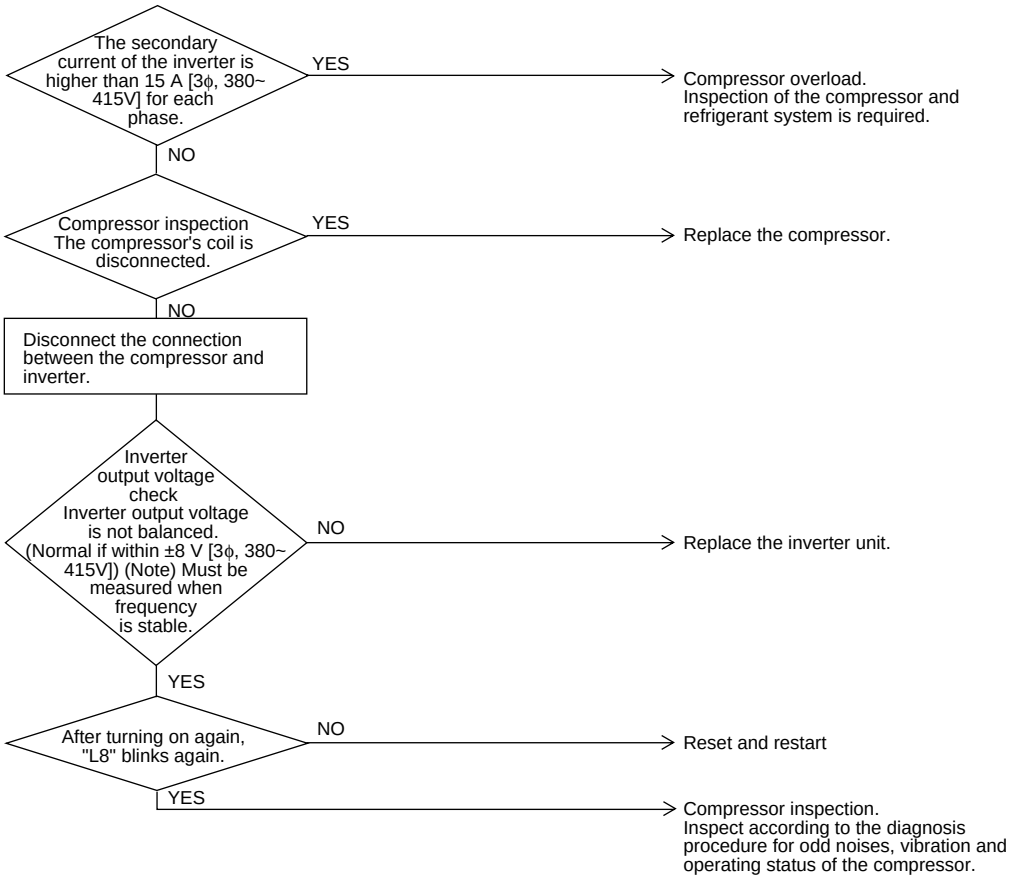
Supposed Causes

- Compressor overload
- Compressor coil disconnected
- Defect of inverter unit

Troubleshooting

Output current check

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The secondary current of the inverter is higher than 15 A [3ϕ, 380~415V] for each phase.
YES
Compressor overload. Inspection of the compressor and refrigerant system is required.
NO
Compressor inspection The compressor's coil is disconnected.
YES
Replace the compressor.
NO
Disconnect the connection between the compressor and inverter.
Inverter output voltage check Inverter output voltage is not balanced. (Normal if within ±8 V [3ϕ, 380~415V]) (Note) Must be measured when frequency is stable.
NO
Replace the inverter unit.
YES
After turning on again, "L8" blinks again.
NO
Reset and restart
YES
Compressor inspection. Inspect according to the diagnosis procedure for odd noises, vibration and operating status of the compressor.

(VF065)

5.4 Outdoor Unit : Inverter Stall Prevention, Compressor Lock

Remote Controller Display

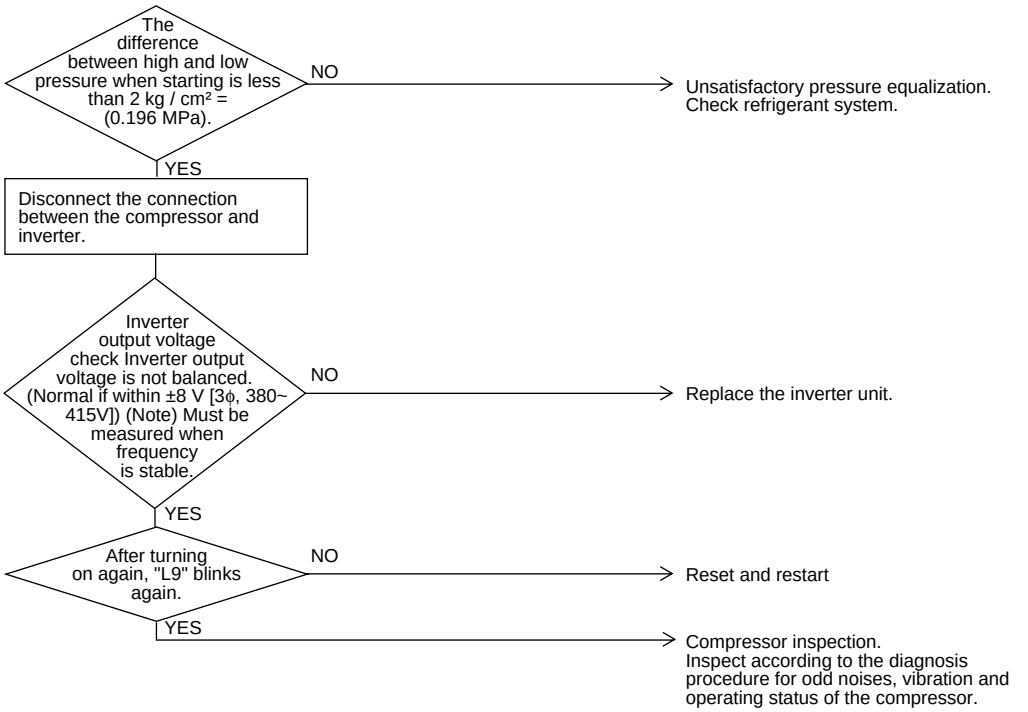
L9

Supposed Causes

- Defect of compressor
- Pressure differential start
- Defect of inverter unit

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The difference between high and low pressure when starting is less than 2 kg / cm² = (0.196 MPa).
NO
Unsatisfactory pressure equalization. Check refrigerant system.
YES
Disconnect the connection between the compressor and inverter.
Inverter output voltage check Inverter output voltage is not balanced. (Normal if within ±8 V [3ϕ, 380~415V]) (Note) Must be measured when frequency is stable.
NO
Replace the inverter unit.
YES
After turning on again, "L9" blinks again.
NO
Reset and restart
YES
Compressor inspection. Inspect according to the diagnosis procedure for odd noises, vibration and operating status of the compressor.

(VF066)

5.5 Outdoor Unit: Malfunction of Transmission between Inverter and Control PC Board

Remote Controller Display

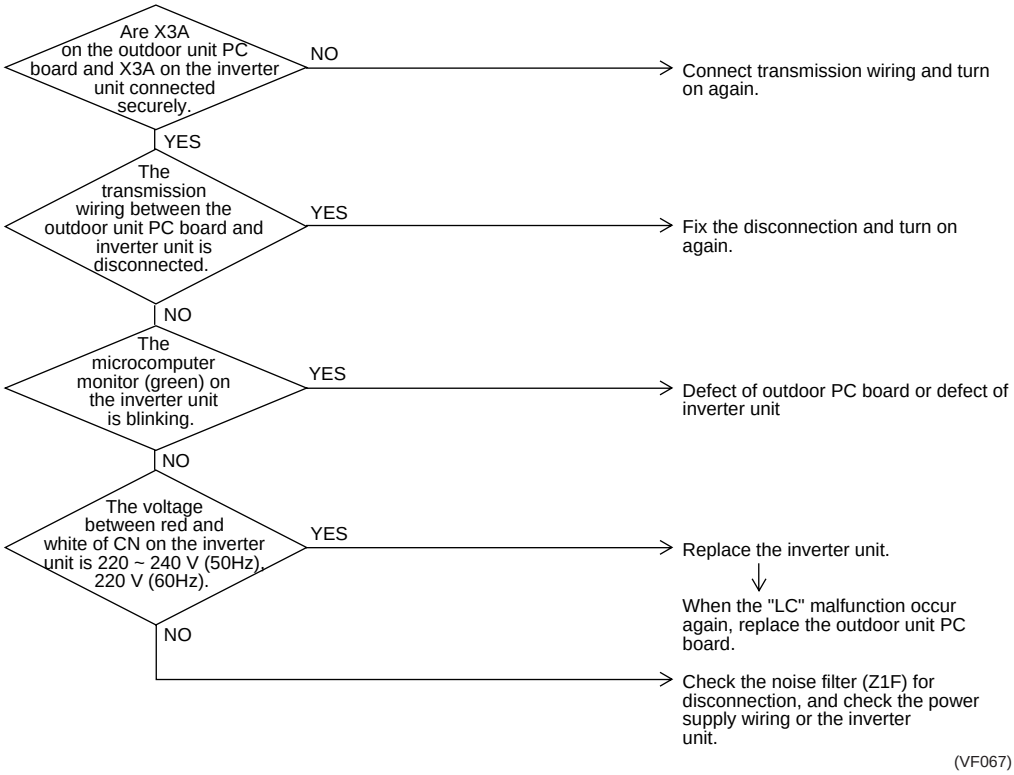
LC

Supposed Causes

- Malfunction of connection between the inverter unit and outdoor unit PC board
- Defect of outdoor unit PC board (transmission section)
- Defect of inverter unit
- Defect of noise filter (Z1F)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Are X3A on the outdoor unit PC board and X3A on the inverter unit connected securely.
NO
Connect transmission wiring and turn on again.
YES
The transmission wiring between the outdoor unit PC board and inverter unit is disconnected.
YES
Fix the disconnection and turn on again.
NO
The microcomputer monitor (green) on the inverter unit is blinking.
YES
Defect of outdoor PC board or defect of inverter unit
NO
The voltage between red and white of CN on the inverter unit is 220 ~ 240 V (50Hz), 220 V (60Hz).
YES
Replace the inverter unit.
When the "LC" malfunction occur again, replace the outdoor unit PC board.
NO
Check the noise filter (Z1F) for disconnection, and check the power supply wiring or the inverter unit.
(VF067)

5.6 Power Supply Insufficient or Instantaneous Failure

Remote Controller Display

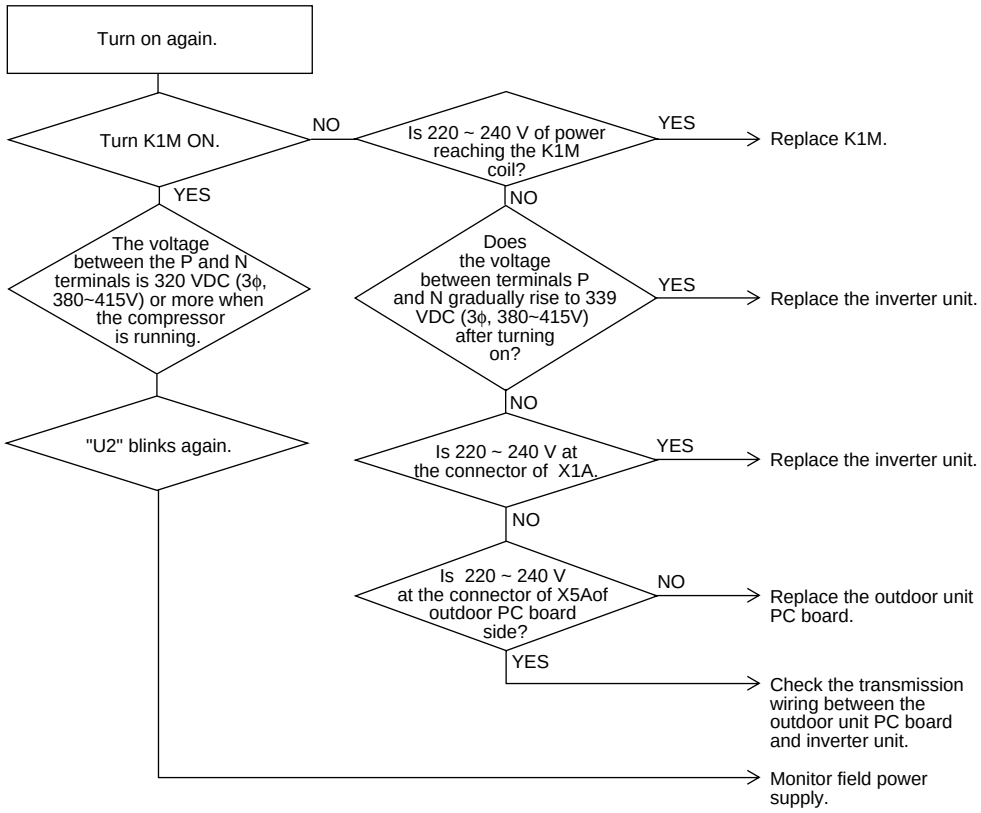
U2

Supposed Causes

- Power supply insufficient
- Instantaneous failure
- Open phase
- Defect of inverter unit
- Defect of outdoor PC board
- Defect of K1M.
- Main circuit wiring defect

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Turn on again.
Turn K1M ON.
NO
Is 220 ~ 240 V of power reaching the K1M coil?
YES
Replace K1M.
YES
NO
The voltage between the P and N terminals is 320 VDC (3ϕ, 380~415V) or more when the compressor is running.
Does the voltage between terminals P and N gradually rise to 339 VDC (3ϕ, 380~415V) after turning on?
YES
Replace the inverter unit.
"U2" blinks again.
NO
Is 220 ~ 240 V at the connector of X1A.
YES
Replace the inverter unit.
NO
Is 220 ~ 240 V at the connector of X5Aof outdoor PC board side?
NO
Replace the outdoor unit PC board.
YES
Check the transmission wiring between the outdoor unit PC board and inverter unit.
Monitor field power supply.

(VF068)

5.7 Outdoor Unit: Inverter Over-Ripple Protection

Remote Controller Display

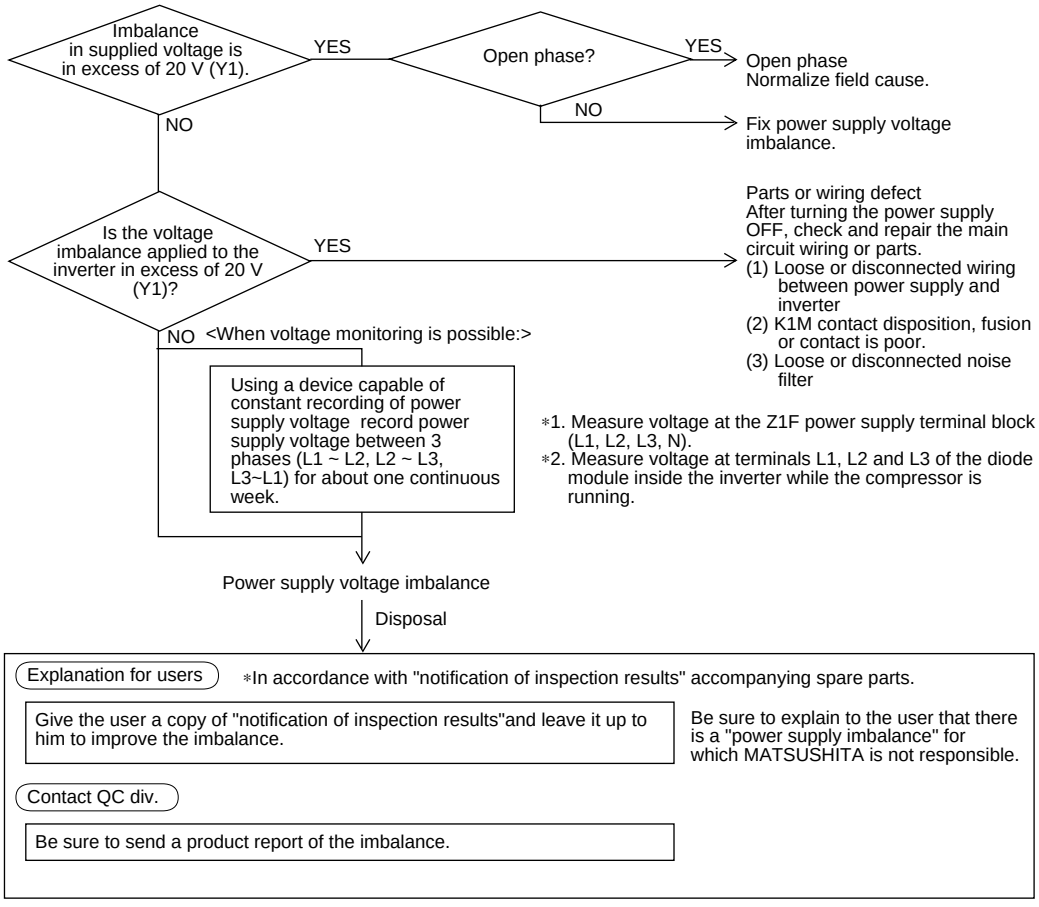
P1

Supposed Causes

- Open phase
- Voltage imbalance between phases
- Defect of main circuit capacitor
- Defect of inverter unit
- Defect of K1M
- Improper main circuit wiring

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Imbalance in supplied voltage is in excess of 20 V (Y1).
YES
Open phase?
YES
Open phase
Normalize field cause.
NO
Fix power supply voltage imbalance.
NO
Is the voltage imbalance applied to the inverter in excess of 20 V (Y1)?
YES
Parts or wiring defect
After turning the power supply OFF, check and repair the main circuit wiring or parts.
(1) Loose or disconnected wiring between power supply and inverter
(2) K1M contact disposition, fusion or contact is poor.
(3) Loose or disconnected noise filter
NO
<When voltage monitoring is possible:>
Using a device capable of constant recording of power supply voltage record power supply voltage between 3 phases (L1 ~ L2, L2 ~ L3, L3~L1) for about one continuous week.
∗1. Measure voltage at the Z1F power supply terminal block (L1, L2, L3, N).
∗2. Measure voltage at terminals L1, L2 and L3 of the diode module inside the inverter while the compressor is running.
Power supply voltage imbalance
Disposal
Explanation for users
∗In accordance with "notification of inspection results" accompanying spare parts.
Give the user a copy of "notification of inspection results"and leave it up to him to improve the imbalance.
Be sure to explain to the user that there is a "power supply imbalance" for which MATSUSHITA is not responsible.
Contact QC div.
Be sure to send a product report of the imbalance.

(VF069)

5.8 Outdoor Unit: Malfunction of Inverter Radiating Fin Temperature Rise Sensor

Remote Controller Display

P4

Supposed Causes

- Defect of radiator fin temperature sensor
- Defect of inverter unit

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

Turn on again after letting 30 minutes or more pass after occurrence of malfunction.
"P4" occurs again.
YES
Replace the radiator fin thermistor.

(VF070)

6. Troubleshooting (OP: Central Remote Controller)

6.1 Malfunction of Transmission between Central Remote Controller and Indoor Unit

Remote Controller Display

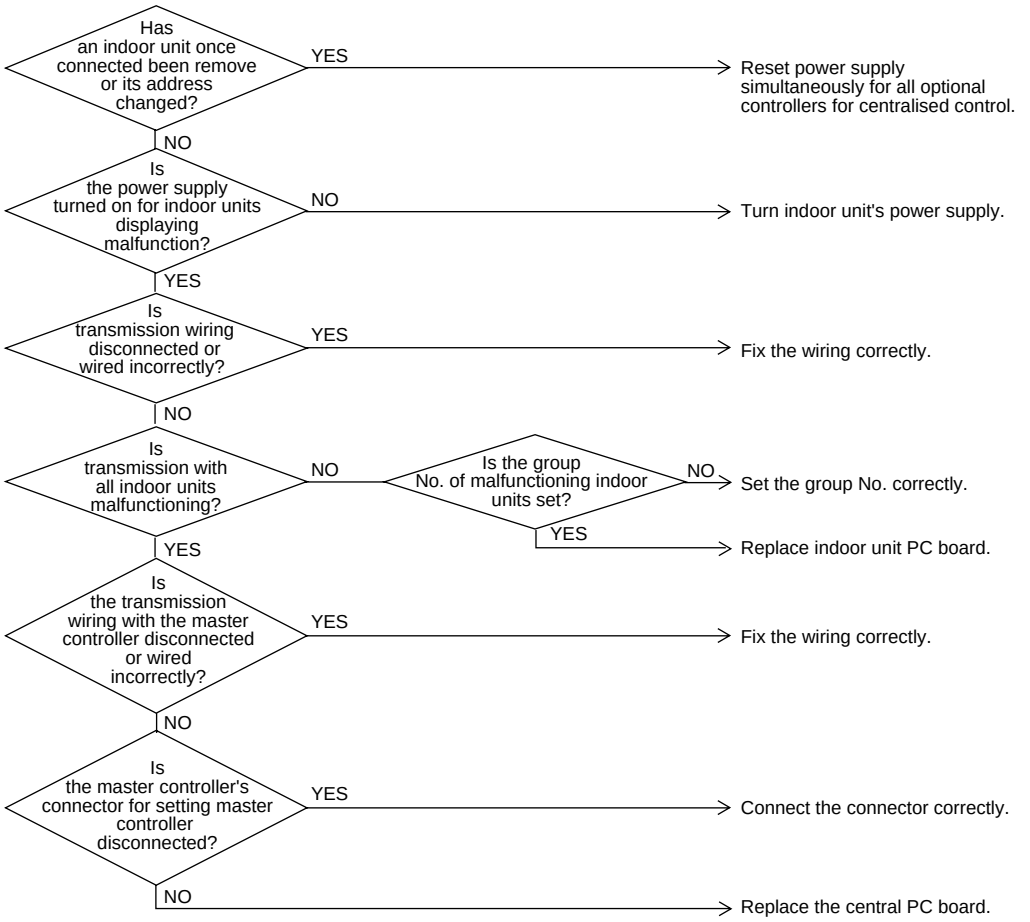
UE

Supposed Causes

- Malfunction of transmission between optional controllers for centralised control and indoor unit
- Connector for setting master controller is disconnected.
- Failure of PC board for central remote controller
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Has an indoor unit once connected been remove or its address changed?
YES
Reset power supply simultaneously for all optional controllers for centralised control.
NO
Is the power supply turned on for indoor units displaying malfunction?
NO
Turn indoor unit's power supply.
YES
Is transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is transmission with all indoor units malfunctioning?
NO
Is the group No. of malfunctioning indoor units set?
NO
Set the group No. correctly.
YES
Replace indoor unit PC board.
YES
Is the transmission wiring with the master controller disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is the master controller's connector for setting master controller disconnected?
YES
Connect the connector correctly.
NO
Replace the central PC board.

(VF071)

6.2 PC Board Defect

Remote Controller Display	
Supposed Causes	■ Defect of central remote controller PC board
Troubleshooting	Replace the central remote controller PC board.

6.3 Malfunction of Transmission between Optional Controllers for Centralised Control

Remote Controller Display

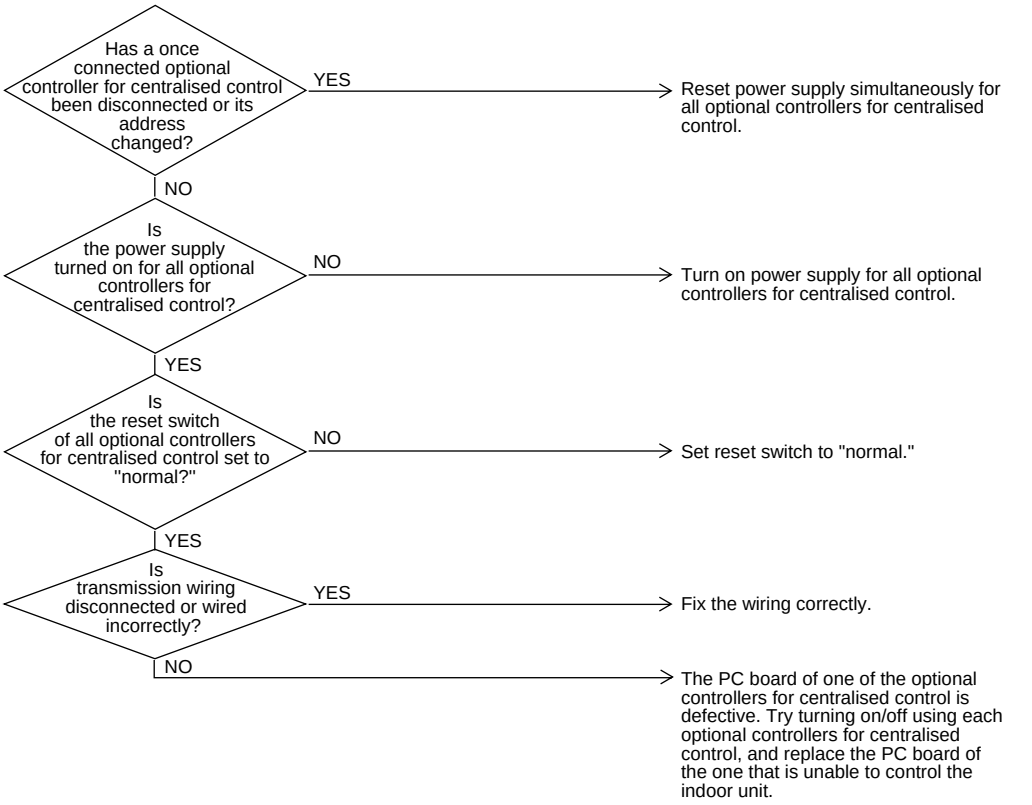
M8

Supposed Causes

- Malfunction of transmission between optional controllers for centralised control
- Defect of PC board of optional controllers for centralised control

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Has a once connected optional controller for centralised control been disconnected or its address changed?
YES
Reset power supply simultaneously for all optional controllers for centralised control.
NO
Is the power supply turned on for all optional controllers for centralised control?
NO
Turn on power supply for all optional controllers for centralised control.
YES
Is the reset switch of all optional controllers for centralised control set to "normal?"
NO
Set reset switch to "normal."
YES
Is transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
The PC board of one of the optional controllers for centralised control is defective. Try turning on/off using each optional controllers for centralised control, and replace the PC board of the one that is unable to control the indoor unit.

(VF072)

6.4 Improper Combination of Optional Controllers for Centralised Control

Remote Controller Display

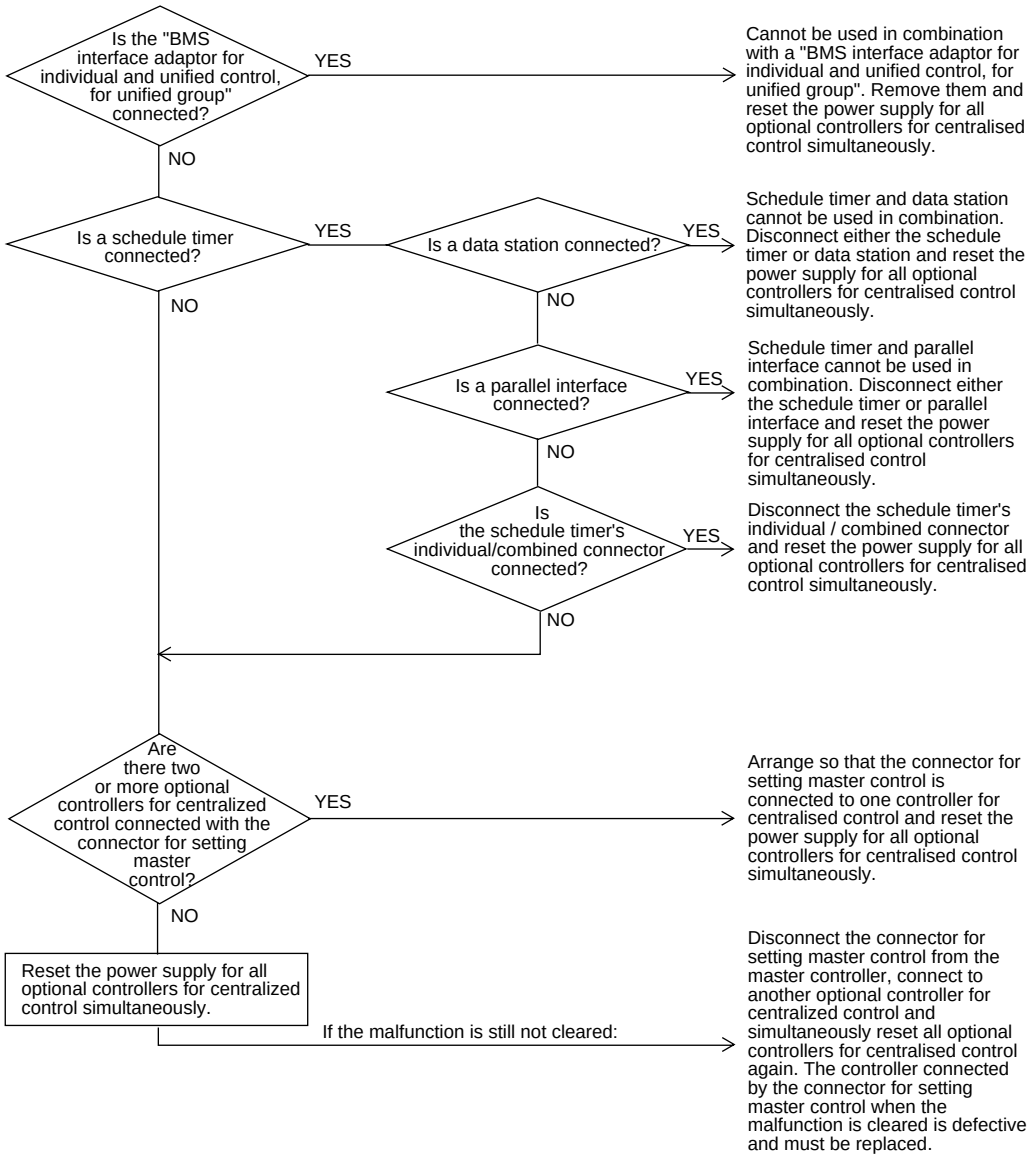
MA

Supposed Causes

- Improper combination of optional controllers for centralised control
- More than one master controller is connected
- Defect of PC board of optional controller for centralised control

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is the "BMS interface adaptor for individual and unified control, for unified group" connected?
YES
Cannot be used in combination with a "BMS interface adaptor for individual and unified control, for unified group". Remove them and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Is a schedule timer connected?
YES
Is a data station connected?
YES
Schedule timer and data station cannot be used in combination. Disconnect either the schedule timer or data station and reset the power supply for all optional controllers for centralised control simultaneously.
NO
NO
Is a parallel interface connected?
YES
Schedule timer and parallel interface cannot be used in combination. Disconnect either the schedule timer or parallel interface and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Is the schedule timer's individual/combined connector connected?
YES
Disconnect the schedule timer's individual / combined connector and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Are there two or more optional controllers for centralized control connected with the connector for setting master control?
YES
Arrange so that the connector for setting master control is connected to one controller for centralised control and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Reset the power supply for all optional controllers for centralized control simultaneously.
If the malfunction is still not cleared:
Disconnect the connector for setting master control from the master controller, connect to another optional controller for centralized control and simultaneously reset all optional controllers for centralised control again. The controller connected by the connector for setting master control when the malfunction is cleared is defective and must be replaced.

(VF073)

6.5 Address Duplication, Improper Setting

Remote Controller Display

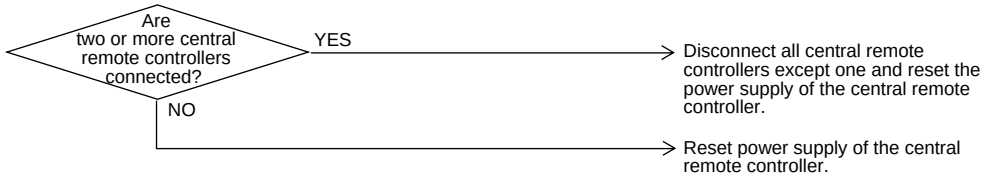
MC

Supposed Causes

- Address duplication of central remote controller

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Are two or more central remote controllers connected?
YES
Disconnect all central remote controllers except one and reset the power supply of the central remote controller.
NO
Reset power supply of the central remote controller.

(VF074)

7. Troubleshooting (OP: Schedule Timer)

7.1 Malfunction of Transmission between Central Remote Controller and Indoor Unit

Remote Controller Display

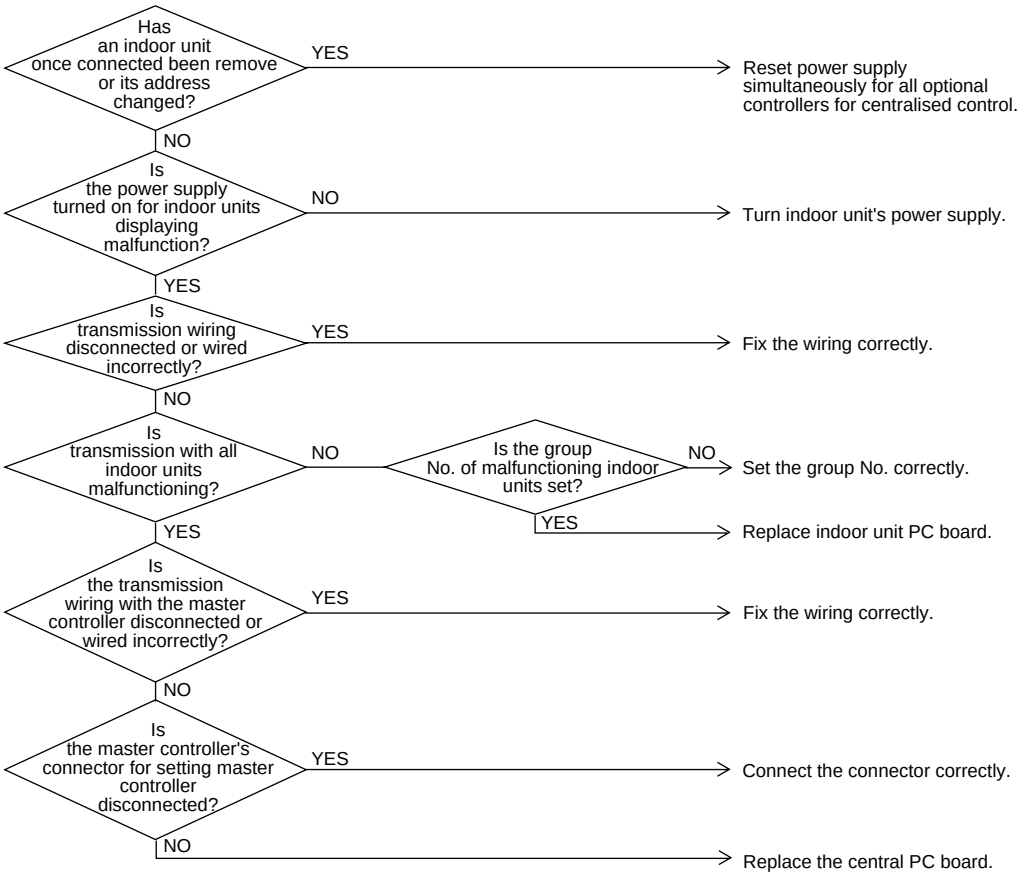
UE

Supposed Causes

- Malfunction of transmission between central remote controller and indoor unit
- Disconnection of connector for setting master controller (or individual/combined switching connector)
- Defect of schedule timer PC board
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Has an indoor unit once connected been remove or its address changed?
YES
Reset power supply simultaneously for all optional controllers for centralised control.
NO
Is the power supply turned on for indoor units displaying malfunction?
NO
Turn indoor unit's power supply.
YES
Is transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is transmission with all indoor units malfunctioning?
NO
Is the group No. of malfunctioning indoor units set?
NO
Set the group No. correctly.
YES
Replace indoor unit PC board.
YES
Is the transmission wiring with the master controller disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is the master controller's connector for setting master controller disconnected?
YES
Connect the connector correctly.
NO
Replace the central PC board.

(VF075)

7.2 PC Board Defect

Remote Controller Display

Supposed Causes

- Defect of schedule timer PC board

Troubleshooting

Replace the schedule timer PC board.

7.3 Malfunction of Transmission between Optional Controllers for Centralised Control

Remote Controller Display

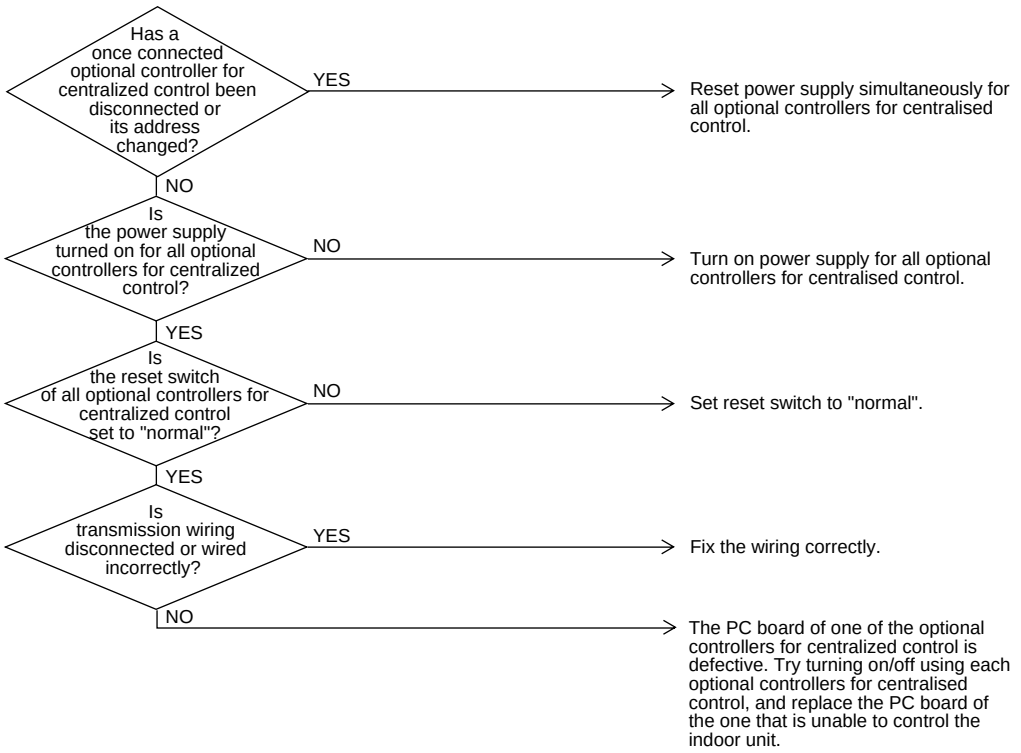
M8

Supposed Causes

- Malfunction of transmission between optional controllers for centralised control
- Defect of PC board of optional controllers for centralized control

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Has a once connected optional controller for centralized control been disconnected or its address changed?
YES
Reset power supply simultaneously for all optional controllers for centralised control.
NO
Is the power supply turned on for all optional controllers for centralized control?
NO
Turn on power supply for all optional controllers for centralised control.
YES
Is the reset switch of all optional controllers for centralized control set to "normal"?
NO
Set reset switch to "normal".
YES
Is transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
The PC board of one of the optional controllers for centralized control is defective. Try turning on/off using each optional controllers for centralised control, and replace the PC board of the one that is unable to control the indoor unit.

(VF076)

7.4 Improper Combination of Optional Controllers for Centralised Control

Remote Controller Display

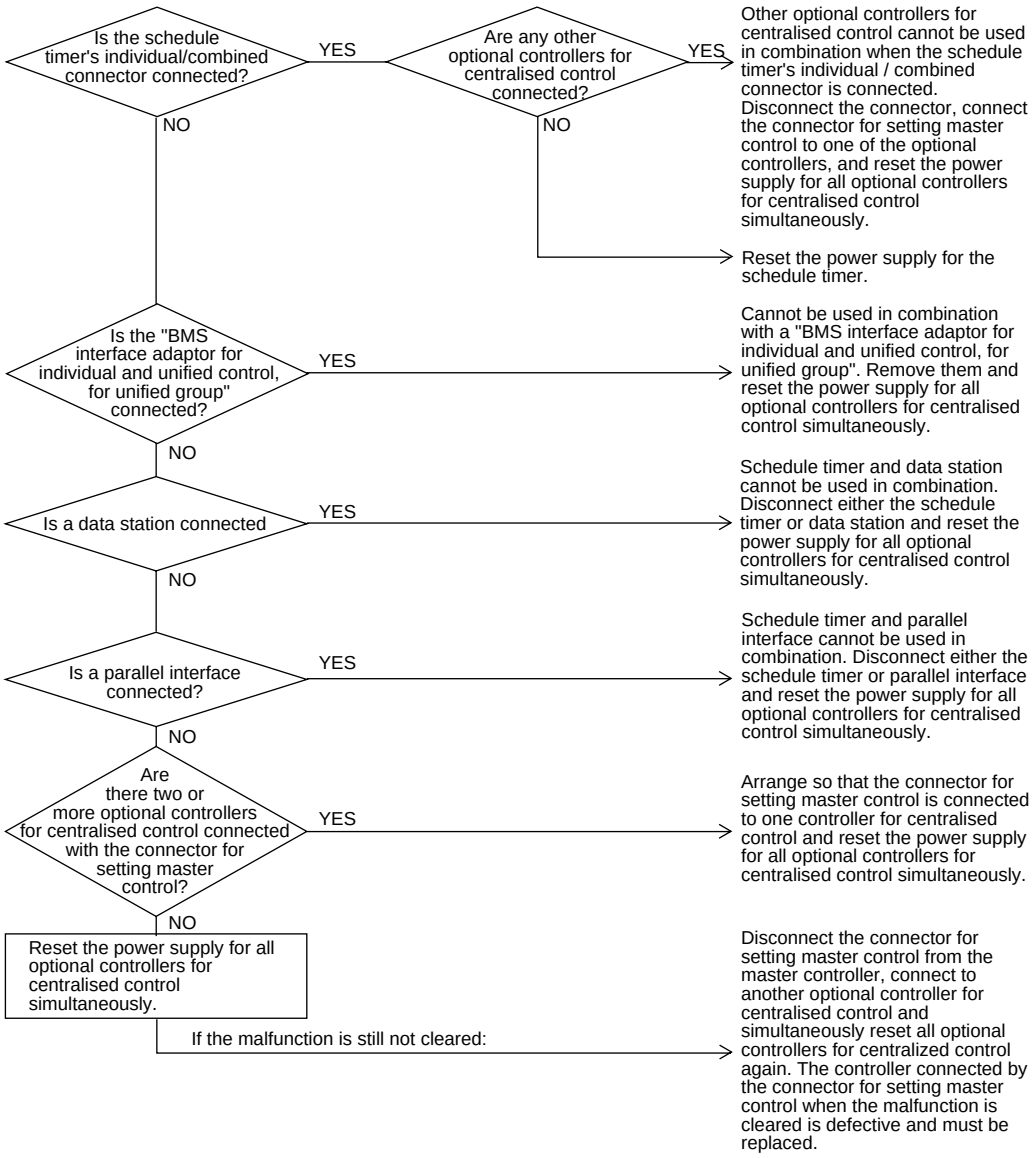
MA

Supposed Causes

- Improper combination of optional controllers for centralised control
- More than one master controller is connected.
- Defect of PC board of optional controllers for centralised control

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is the schedule timer's individual/combined connector connected?
YES
Are any other optional controllers for centralised control connected?
YES
Other optional controllers for centralised control cannot be used in combination when the schedule timer's individual / combined connector is connected. Disconnect the connector, connect the connector for setting master control to one of the optional controllers, and reset the power supply for all optional controllers for centralised control simultaneously.
NO
NO
Reset the power supply for the schedule timer.
Is the "BMS interface adaptor for individual and unified control, for unified group" connected?
YES
Cannot be used in combination with a "BMS interface adaptor for individual and unified control, for unified group". Remove them and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Is a data station connected
YES
Schedule timer and data station cannot be used in combination. Disconnect either the schedule timer or data station and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Is a parallel interface connected?
YES
Schedule timer and parallel interface cannot be used in combination. Disconnect either the schedule timer or parallel interface and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Are there two or more optional controllers for centralised control connected with the connector for setting master control?
YES
Arrange so that the connector for setting master control is connected to one controller for centralised control and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Reset the power supply for all optional controllers for centralised control simultaneously.
If the malfunction is still not cleared:
Disconnect the connector for setting master control from the master controller, connect to another optional controller for centralised control and simultaneously reset all optional controllers for centralized control again. The controller connected by the connector for setting master control when the malfunction is cleared is defective and must be replaced.

(VF077)

7.5 Address Duplication, Improper Setting

Remote Controller Display

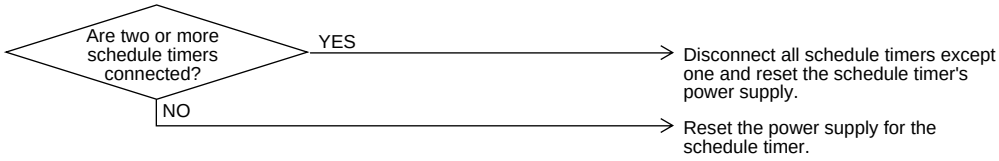
MC

Supposed Causes

- Address duplication of optional controllers for centralised control

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Are two or more schedule timers connected?
YES
Disconnect all schedule timers except one and reset the schedule timer's power supply.
NO
Reset the power supply for the schedule timer.

(VF078)

8. Troubleshooting (OP: Unified ON/OFF Controller)

8.1 Operation Lamp Blinks

Remote Controller Display

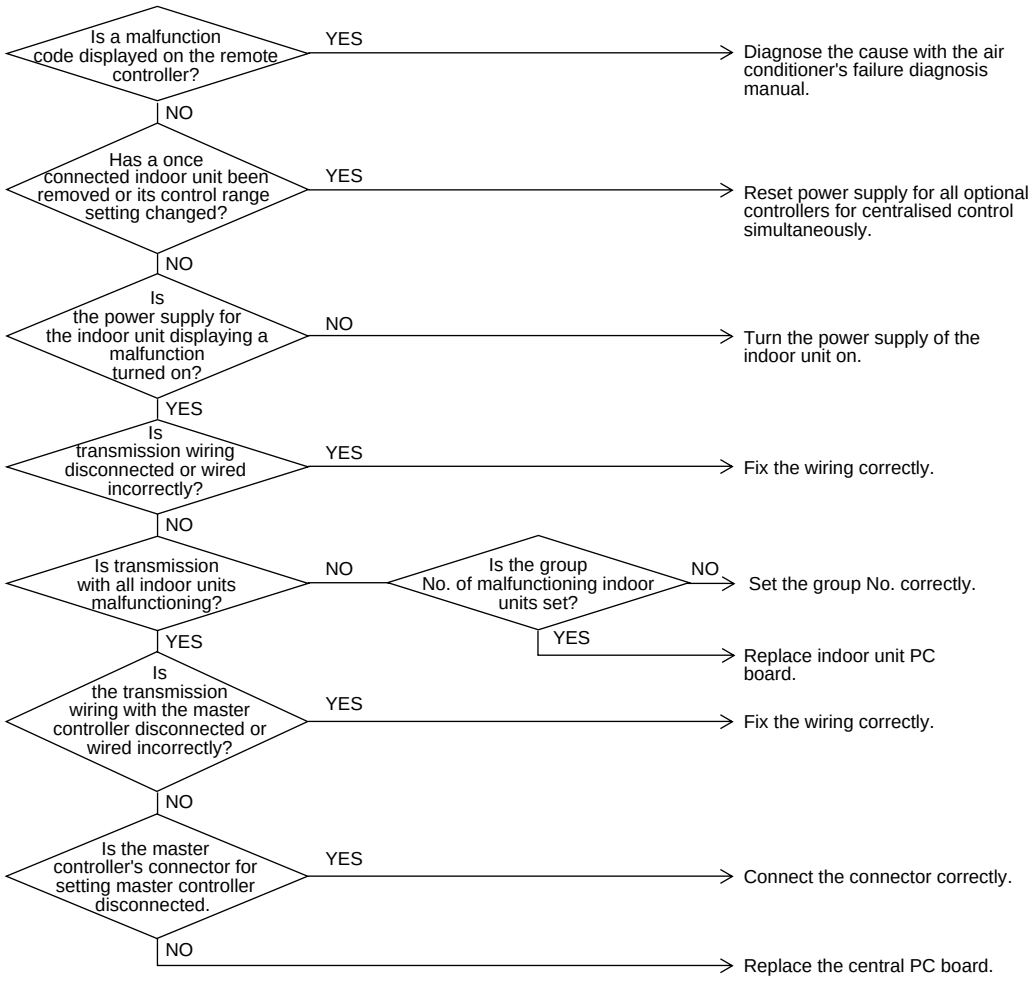
Operation lamp blinks

Suppposed Causes

- Malfunction of transmission between optional controller and indoor unit
- Connector for setting master controller is disconnected
- Defect of unified ON/OFF controller
- Defect of indoor unit PC board
- Malfunction of air conditioner

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is a malfunction code displayed on the remote controller?
YES
Diagnose the cause with the air conditioner's failure diagnosis manual.
NO
Has a once connected indoor unit been removed or its control range setting changed?
YES
Reset power supply for all optional controllers for centralised control simultaneously.
NO
Is the power supply for the indoor unit displaying a malfunction turned on?
NO
Turn the power supply of the indoor unit on.
YES
Is transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is transmission with all indoor units malfunctioning?
NO
Is the group No. of malfunctioning indoor units set?
NO
Set the group No. correctly.
YES
Replace indoor unit PC board.
YES
Is the transmission wiring with the master controller disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is the master controller's connector for setting master controller disconnected.
YES
Connect the connector correctly.
NO
Replace the central PC board.

(VF079)

8.2 Display “Under Host Computer Integrate Control” Blinks (Repeats Single Blink)

Remote Controller Display

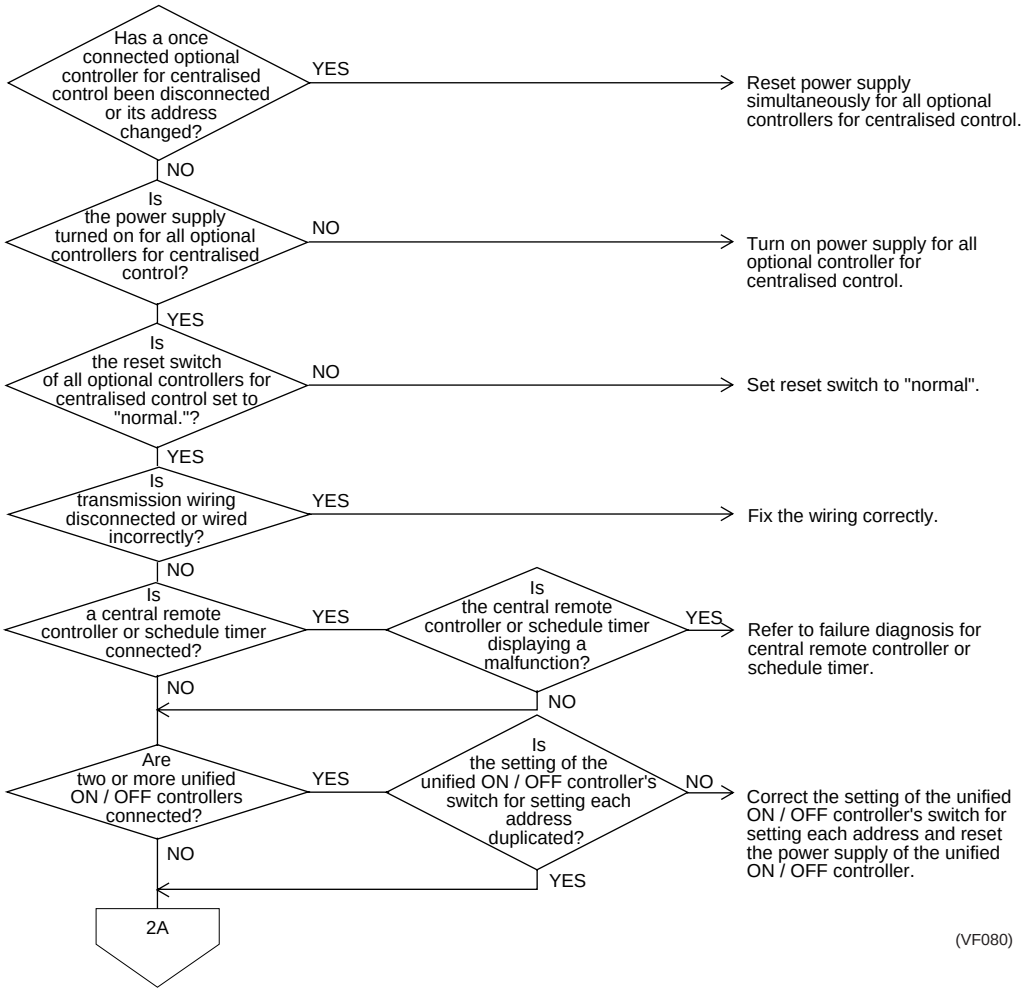
“under host computer integrated control” (Repeats single blink)

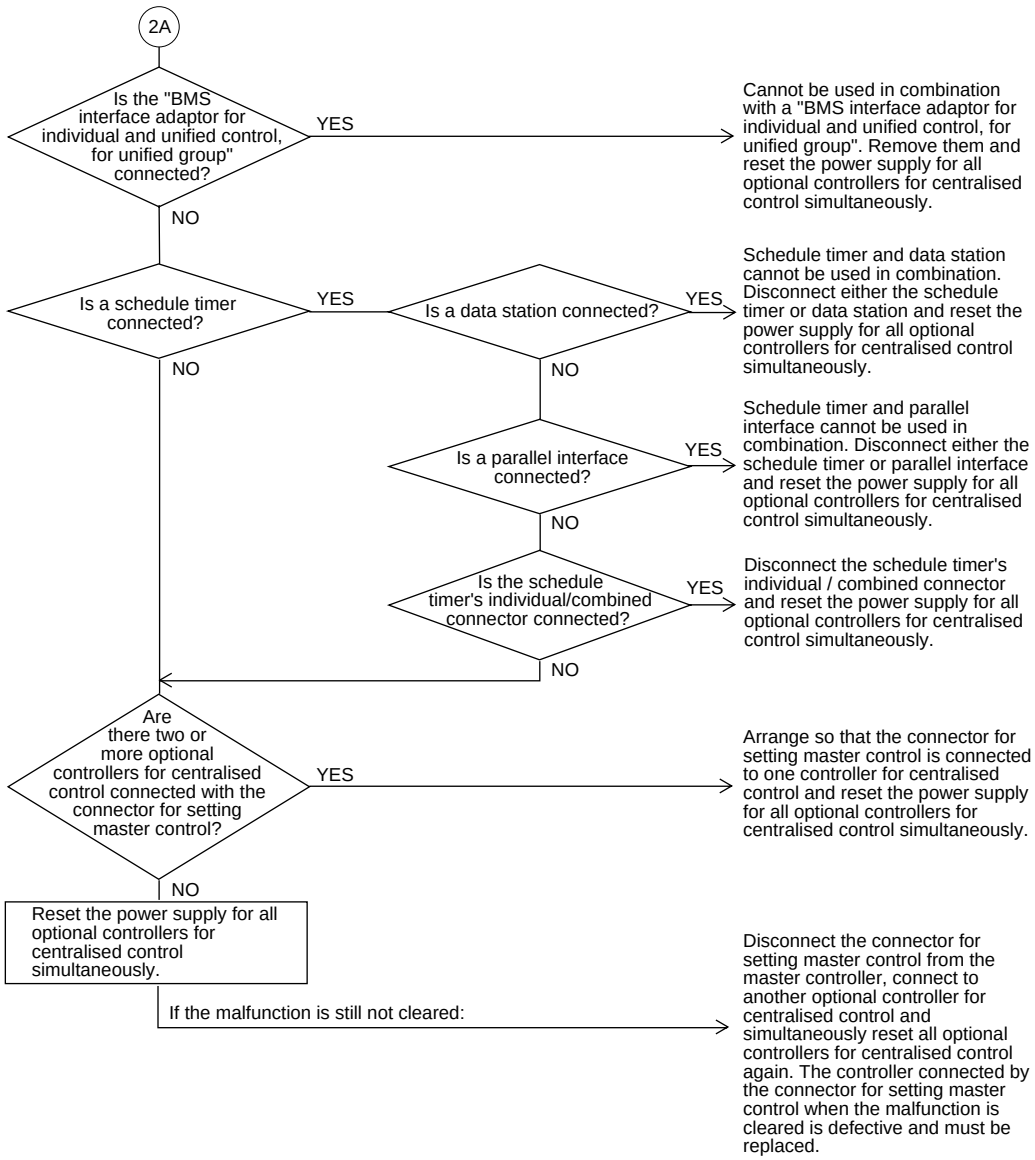
Supposed Causes

- Address duplication of central remote controller
- Improper combination of optional controllers for centralised control
- Connection of more than one master controller
- Malfunction of transmission between optional controllers for centralised control
- Defect of PC board of optional controllers for centralised control

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Has a once connected optional controller for centralised control been disconnected or its address changed?
YES
Reset power supply simultaneously for all optional controllers for centralised control.
NO
Is the power supply turned on for all optional controllers for centralised control?
NO
Turn on power supply for all optional controller for centralised control.
YES
Is the reset switch of all optional controllers for centralised control set to "normal."?
NO
Set reset switch to "normal".
YES
Is transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is a central remote controller or schedule timer connected?
YES
Is the central remote controller or schedule timer displaying a malfunction?
YES
Refer to failure diagnosis for central remote controller or schedule timer.
NO
NO
Are two or more unified ON / OFF controllers connected?
YES
Is the setting of the unified ON / OFF controller's switch for setting each address duplicated?
NO
Correct the setting of the unified ON / OFF controller's switch for setting each address and reset the power supply of the unified ON / OFF controller.
NO
YES
2A
(VF080)


2A
Is the "BMS interface adaptor for individual and unified control, for unified group" connected?
YES
Cannot be used in combination with a "BMS interface adaptor for individual and unified control, for unified group". Remove them and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Is a schedule timer connected?
YES
Is a data station connected?
YES
Schedule timer and data station cannot be used in combination. Disconnect either the schedule timer or data station and reset the power supply for all optional controllers for centralised control simultaneously.
NO
NO
Is a parallel interface connected?
YES
Schedule timer and parallel interface cannot be used in combination. Disconnect either the schedule timer or parallel interface and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Is the schedule timer's individual/combined connector connected?
YES
Disconnect the schedule timer's individual / combined connector and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Are there two or more optional controllers for centralised control connected with the connector for setting master control?
YES
Arrange so that the connector for setting master control is connected to one controller for centralised control and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Reset the power supply for all optional controllers for centralised control simultaneously.
If the malfunction is still not cleared:
Disconnect the connector for setting master control from the master controller, connect to another optional controller for centralised control and simultaneously reset all optional controllers for centralised control again. The controller connected by the connector for setting master control when the malfunction is cleared is defective and must be replaced.

(VF081)

8.3 Display “Under Host Computer Integrate Control” Blinks (Repeats Double Blink)

Remote Controller Display

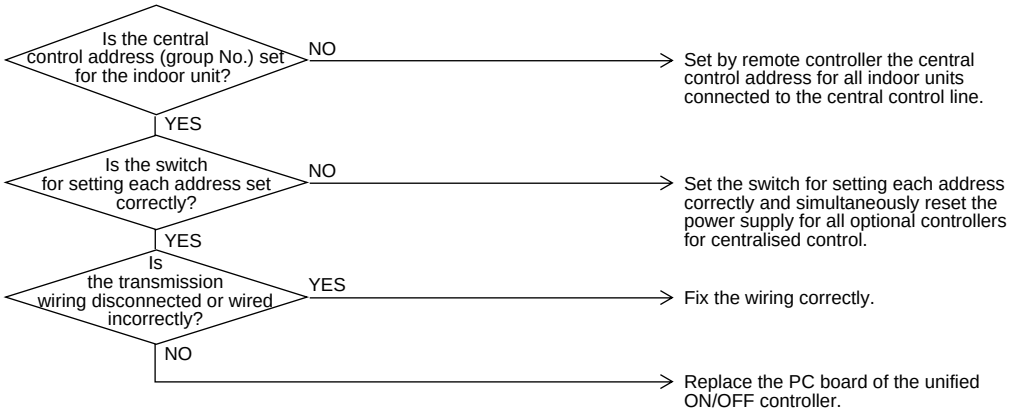
“under host computer integrated control” (Repeats double blink)

Supposed Causes

- Central control address (group No.) is not set for indoor unit.
- Improper address setting
- Improper wiring of transmission wiring

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is the central control address (group No.) set for the indoor unit?
NO
Set by remote controller the central control address for all indoor units connected to the central control line.
YES
Is the switch for setting each address set correctly?
NO
Set the switch for setting each address correctly and simultaneously reset the power supply for all optional controllers for centralised control.
YES
Is the transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Replace the PC board of the unified ON/OFF controller.

(VF082)

UM Series Using R-407C

Combination MX1R Series

Part 1
General Information

1. Product Outline 408
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1.2 Outline of New Series Products 409
1.3 Model Configuration and Combination 411

1. Product Outline

1.1 Year 2001 Models Using New Refrigerant

Outdoor Unit Series

● New model

Series name \ Equivalent horsepower (HP)	16	18	20	24	26	28	30
Urban Multi series	●	●	●	●	●	●	●

Indoor Unit Series

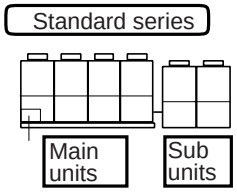
● New model

	Model	Type P20	Type P25	Type P32	Type P40	Type P50	Type P63	Type P80	Type P100	Type P125	Type P200	Type P250
4-way cassette type	CS-UM	●	●	●	●	●	●	●	●	●	—	—
2-way cassette type	CS-LM	●	●	●	●	●	●	●	—	●	—	—
Corner type	CS-DM	—	●	●	●	—	●	—	—	—	—	—
Built-in type	CS-FM	●	●	●	●	●	●	●	●	●	—	—
Small duct type	CS-NM	●	●	—	—	—	—	—	—	—	—	—
Ducted type	CS-EM	—	—	—	●	●	●	●	●	●	●	●
Ceiling type	CS-TM	—	—	●	—	—	●	—	●	—	—	—
Wall type	CS-KM	●	●	●	●	●	●	—	—	—	—	—
Floor standing type	CS-PM	●	●	●	●	●	●	—	—	—	—	—
Concealed floor standing type	CS-RM	●	●	●	●	●	●	—	—	—	—	—

1.2 Outline of New Series Products

In addition to the use of a new refrigerant (R407C), the new series products incorporate a function-unit-less structure for significantly improved flexibility and ease of installation.

System outline



General name	PA~MA
Main unit name	CU~MA
Sub unit name	CU~MB

(V0800)

- No function unit
  All models combine Main units and Sub units or main units, sub units and Plus units.
- All models use a new refrigerant with low ozone destruction potential and global warming potential to minimize environmental loads (see Feature (1)).
  With a value of 1 given to the ozone destruction potential and global warming potential of the R11 refrigerant, smaller values mean less environmental impact.

Feature (1)

- Use of new refrigerant (R407C) that does not deplete the ozone layer

Refrigerant		Condensing pressure (MPa)	Capacity ∗1	COP	Ozone destruction potential	Global warming potential
R22	Single-component	1.88	100	100	0.05	0.43
R407C	Non-azeotropic	2.05	98	90~97	0	0.38

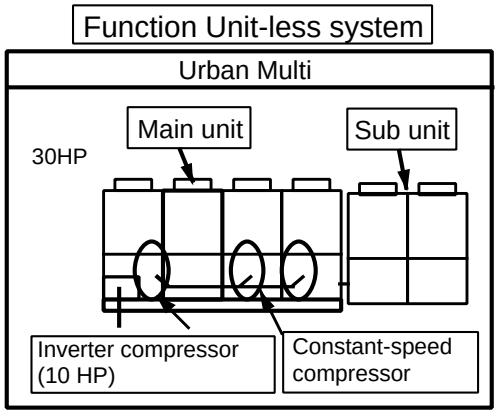
∗1 Capacity value based on theoretical refrigerating cycle

< Global warming potential >

Water vapor and carbon gas allow solar rays to pass through, but they hinder the penetration of heat rays from the surface of the earth. Methane, chlorofluorocarbons and dinitrogen monoxide have similar characteristics. When the amounts of these gases in the atmosphere increase, heat that normally escapes through the atmosphere remains near the earth's surface, thus increasing the temperature of air. The degree of the effect to the earth caused by the atmospheric temperature rise due to these gases is numerically expressed by global warming potential (GWP).

Feature (2)

- Dramatically improved flexibility and ease of field installation by function-unit-less structure
  --- Simpler piping work at installation sites
  --- Reduced unit installation area



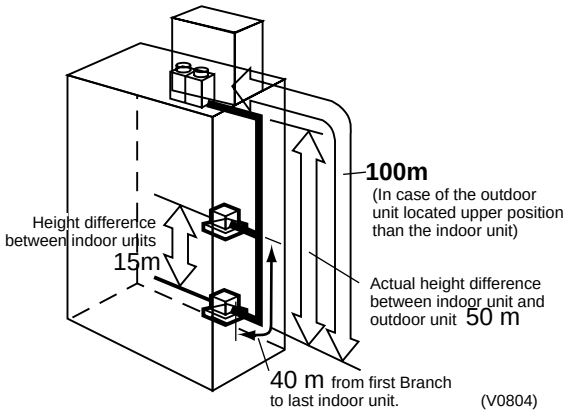
(V0802)

- Simpler piping work at installation sites

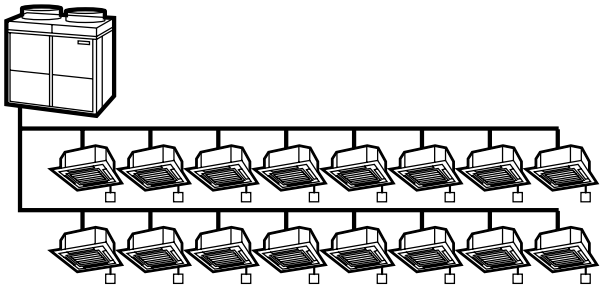
	20HP	30HP
Pipe connecting locations	6 joints	6 joints

Other versatile functions are provided

- **Long refrigerant piping : equivalent length of 125, actual length of 100 m and height difference of 50 m.**
- **Connection of indoor unit of varying capacities and types totaling 130% (max.) of outdoor unit by capacity.**


100m
(In case of the outdoor unit located upper position than the indoor unit)
Height difference between indoor units
15m
Actual height difference between indoor unit and outdoor unit 50 m
40 m from first Branch to last indoor unit.
(V0804)

- **Individual control of up to 20 indoor units with one 20HP class outdoor unit**



- For Urban Multi Combination

Outdoor unit name	No. of indoor units connectable
PA-16~20MA	20 units
PA-24~30MA	32 units

- **Others**
- High efficiency with power factor of 90% or higher
- Cooling operation with outdoor air temperature as low as –5°C
- Heating operation with outdoor air temperature as low as –15°C
- Simple Branch piping system
- Super wiring system
- Automatic address setting function
- Built-in wiring error check function
- Equipped with sequential start function
- Nighttime low-noise mode for reduced operating sound

1.3 Model Configuration and Combination

Number of units and capacity of connectable indoor units

Standard series	Equivalent output		16HP	18HP	20HP	24HP
	R407C Urban Multi Combination series system model		PA-16MA1XPK	PA-18MA1XPK	PA-20MA1XPK	PA-24MA1XPK
	Outdoor unit combination	Main unit	CU-8MA1XPK	CU-10MA1XPK	CU-10MA1XPK	CU-16MA1XPK
		Sub unit	CU-8MB1XPK	CU-8MB1XPK	CU-10MB1XPK	CU-8MB1XPK
	Total number of connectable indoor units		Up to 20 units			Up to 32 units
	Total capacity of connectable indoor units		200~520	225~585	250~650	300~780

Standard series	Equivalent output		26HP	28HP	30HP
	R407C Urban Multi Combination series system model		PA-26MA1XPK	PA-28MA1XPK	PA-30MA1XPK
	Outdoor unit combination	Main unit	CU-16MA1XPK	CU-20MA1XPK	CU-20MA1XPK
		Sub unit	CU-10MB1XPK	CU-8MB1XPK	CU-10MB1XPK
	Total number of connectable indoor units		Up to 32 units		
	Total capacity of connectable indoor units		325~845	350~910	375~975

Connectable indoor unit

Indoor unit	Model name
4-way cassette type	CS-20·25·32·40·50·63·80·100·125UMHPP
2-way cassette type	CS-20·25·32·40·50·63·80·125LMHPP
Corner type	CS-25·32·40·63DM1HPK
Built-in type	CS-20·25·32·40·50·63·80·100·125FMHPP
Small duct type	CS-20·25NM1HPP
Ducted type	CS-40·50·63·80·100·125·200·250EMHPK
Ceiling type	CS-32·63·100TMJPL
Wall type	CS-20·25·32·40·50·63KM1HPK
Floor standing type	CS-20·25·32·40·50·63PM1HPK
Concealed floor standing type	CS-20·25·32·40·50·63RM1HPK

Indoor unit capacity

New refrigerant model code	20 type	25 type	32 type	40 type	50 type	63 type	80 type	100 type	125 type	200 type	250 type
Selecting model capacity	2.2kW	2.8kW	3.5kW	4.5kW	5.6kW	7.0kW	9.0kW	11.2kW	14.0kW	22.4kW	28.0kW
Equivalent output	0.8HP	1HP	1.25HP	1.6HP	2.0HP	2.5HP	3.2HP	4HP	5HP	8HP	10HP

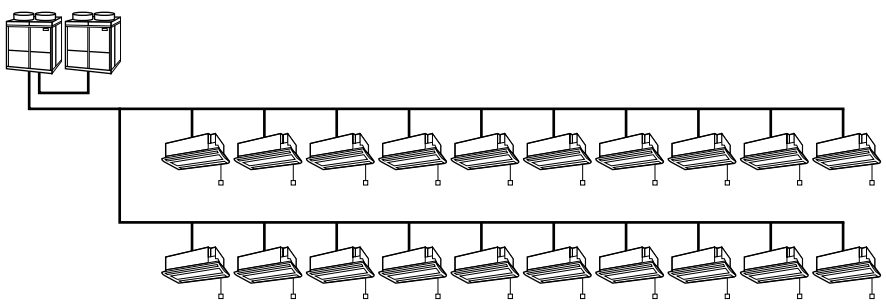
Use the above tables to determine the capacities of indoor units to be connected. Make sure the total capacity of indoor units connected to each outdoor unit is within the specified value (kW).

- The total capacity of connected indoor units must be within a range of 50 to 130% of the rated capacity of the outdoor unit.
- In some models, it is not possible to connect the maximum number of connectable indoor units. Select models so the total capacity of connected indoor units conforms to the specification.

Combination example

- PA-20MA1XPK / 20-unit system

Indoor unit / CS-25LMHPP × 20 units



(V0806)

Part 2
Function

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   3.2 Indoor Unit.....445

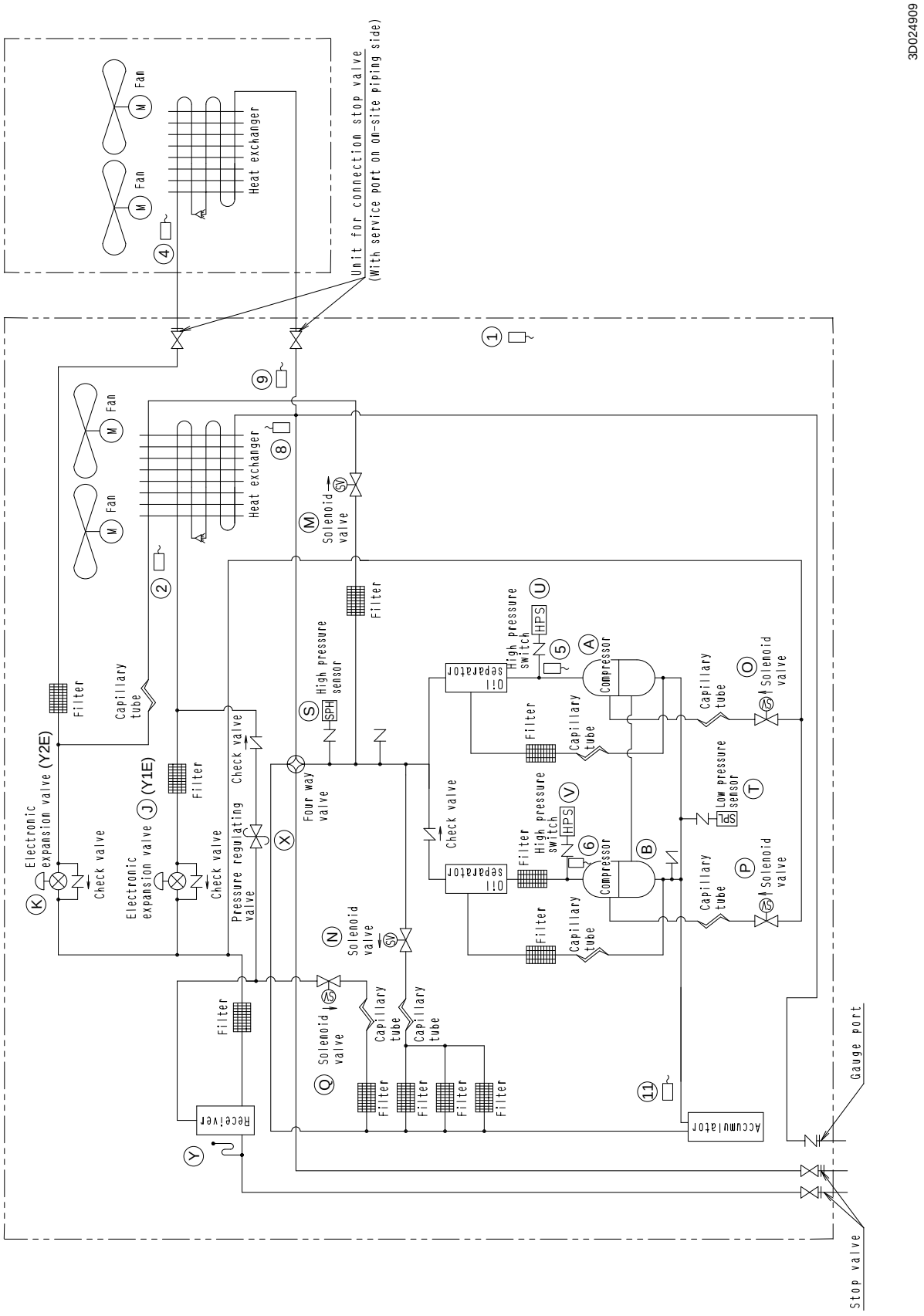
1. Outdoor Unit Refrigerant System Diagram

1.1 Outdoor Unit Refrigerant System Diagram

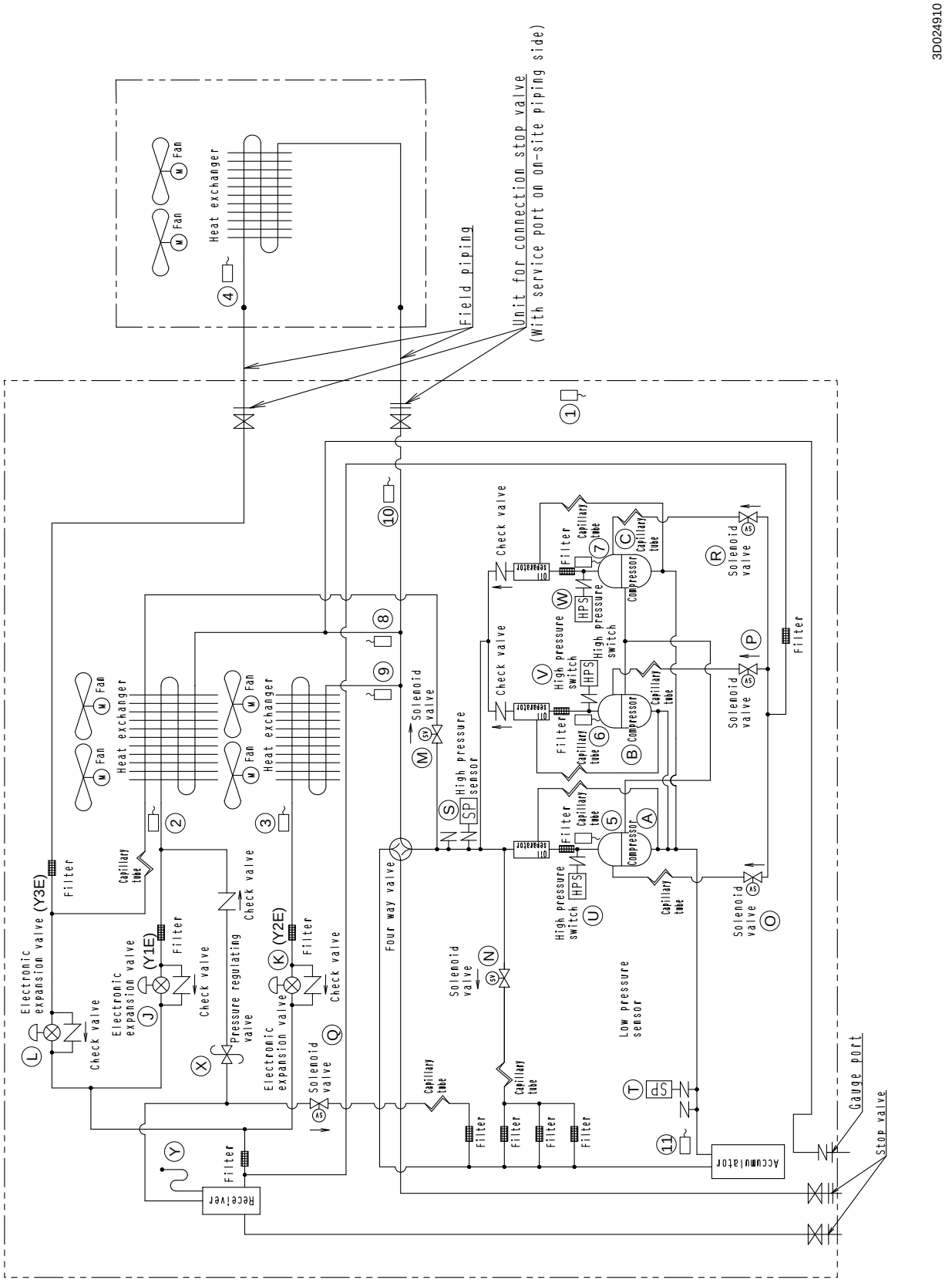
PA-16~30MA1XPK

No.	Name	Code	Function	Remarks
A	Inverter compressor	M1C	Combination of a compressor (inverter compressor) capable of operating at 29-79 Hz with inverter drive and compressors (constant-speed compressors) operable only on commercial power supply achieves 45-step control (38 steps in PA-16·18·20MA).	
B	Constant-speed compressor 1	M2C		
C	Constant-speed compressor 2	M3C		(PA-24~30MA only)
J	Electronic expansion valve	Y1E	(For master unit heat exchangers) Provides PI control during heating operation to maintain constant superheated degree (SH).	(Master unit's left side exchanger in case of PA-24~30MA1XPK)
K	Electronic expansion valve	Y2E	(For sub unit heat exchangers) Provides PI control during heating operation to maintain constant superheated degree (SH).	(Master unit's right side heat exchanger in case of PA-24~30MA1XPK)
L	Electronic expansion valve	Y3E	(For sub unit's heat exchanger) Provides PI control during heating operation to maintain constant superheated degree (SH).	(PA-24~30MA only)
M	Solenoid valve	Y1S	(For auxiliary condensers)	
N	Solenoid valve	Y2S	(For hot gas bypass and pressure equalization) Bypasses hot gas during transitional operation such as defrosting operation to prevent sudden decrease of low pressure. Also equalizes pressure to reduce startup load.	
O	Solenoid valve	Y3S	(For inverter unit liquid injection) Provides liquid injection to prevent overheating operation.	
P	Solenoid valve	Y4S	(For constant-speed unit liquid injection) Provides liquid injection to prevent overheating operation.	
Q	Solenoid valve	Y5S	(For receivers)	
R	Solenoid valve	Y6S	(For constant-speed unit liquid injection) Provides liquid injection to prevent overheating operation.	(PA-24~30MA only)
S	High pressure sensor	SENPH	Heating operation: Provides PI control for compressors by detecting high pressure. Cooling operation: Controls compressors to ensure sufficient high pressure when outside temperature is low.	
T	Low pressure sensor	SENPL	Cooling operation: Provides PI control for compressors by detecting low pressure. Heating operation: Controls motorized valves to maintain constant evaporator superheated degree.	
U	High pressure switch	S1PH	Opens at set pressure of 3.09 MPa to stop operation.	
V	High pressure switch	S2PH		
W	High pressure switch	S3PH		(PA-24~30MA only)
X	Pressure regulating valve		Pressure relief valve to protect liquid sealing in receiver piping during transportation or storing. It opens at 2.65 MPa.	
Y	Fusible plug		Plug head melt at 70~75°C around receiver and high pressure and high temperature refrigerant is relived.	
1	Outside air thermistor	R1T	Detects outside temperature and uses it as a function in determining defrost IN conditions during heating operation.	
2	Heat exchanger thermistor 1	R2-1(11)T	Uses inlet temperature of each heat exchanger as a function (together with outside temperature data) in determining defrost IN conditions during heating operation.	
3	Heat exchanger thermistor 2	R2-12T		(PA-24~30MA only)
4	Heat exchanger thermistor 3	R2-2T		
5	Discharge pipe thermistor 1	R3-1(11)T	Detects discharge pipe temperature of inverter compressor and use it for compressor discharge pipe temperature protection.	
6	Discharge pipe thermistor 2	R3-2(12)T	Detects discharge pipe temperature of constant-speed compressor 1 and use it for compressor discharge pipe temperature protection.	
7	Discharge pipe thermistor 3	R3-13T	Detects discharge pipe temperature of constant-speed compressor 2 and use it for compressor discharge pipe temperature protection.	(PA-24~30MA only)
8	Header thermistor 1	R4-1(11)T	Detects outlet temperatures of heat exchangers and uses it in constant superheated degree (SH) control (electronic expansion valve control)	
9	Header thermistor 2	R4-2(12)T		
10	Header thermistor 3	R4-13T		(PA-24~30MA only)
11	Suction pipe thermistor	R6-1T	Detect accumulator outlet temperature and protect compressor.	

PA-16·18·20MA1XPK

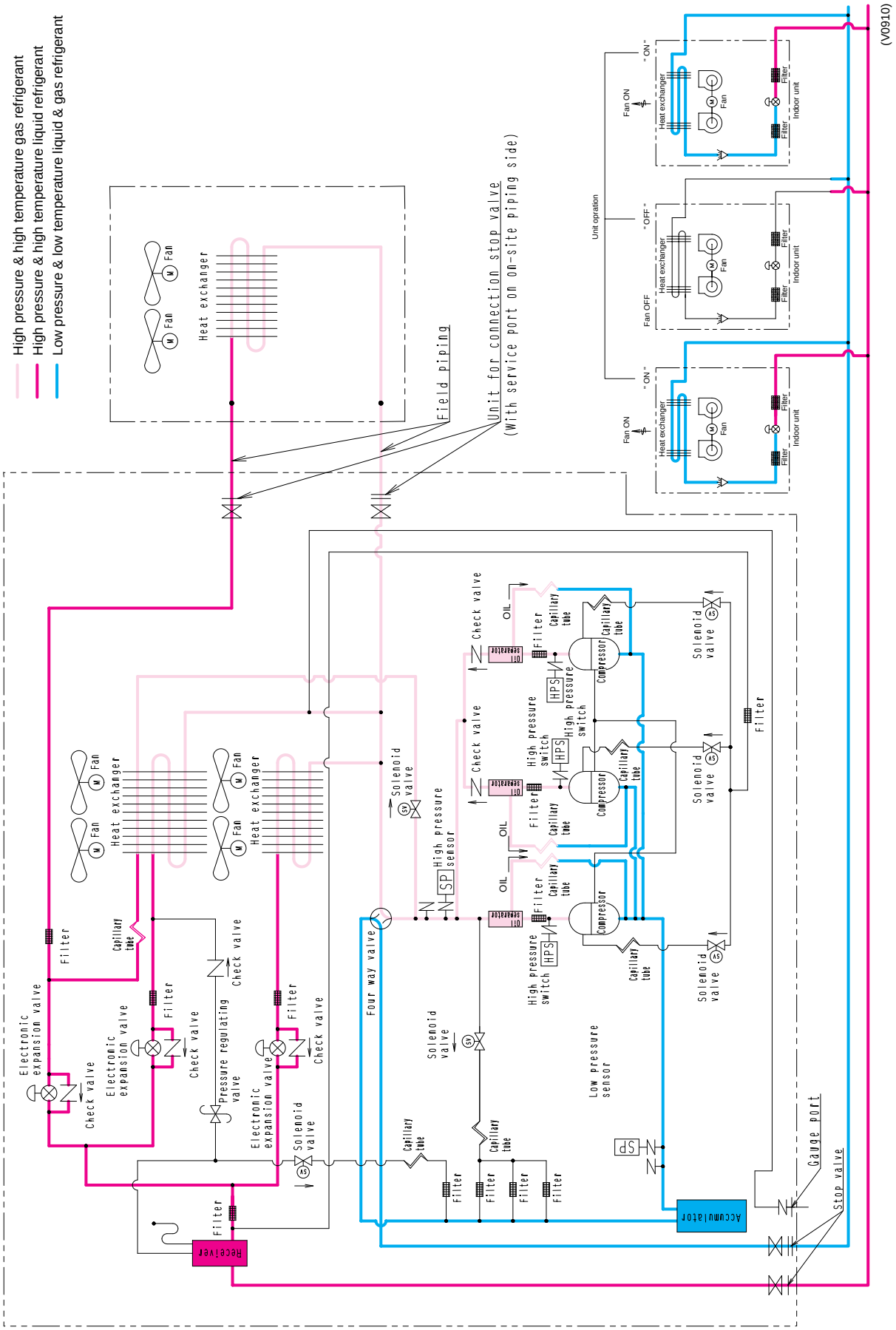


PA-24·26·28·30MA1XPK

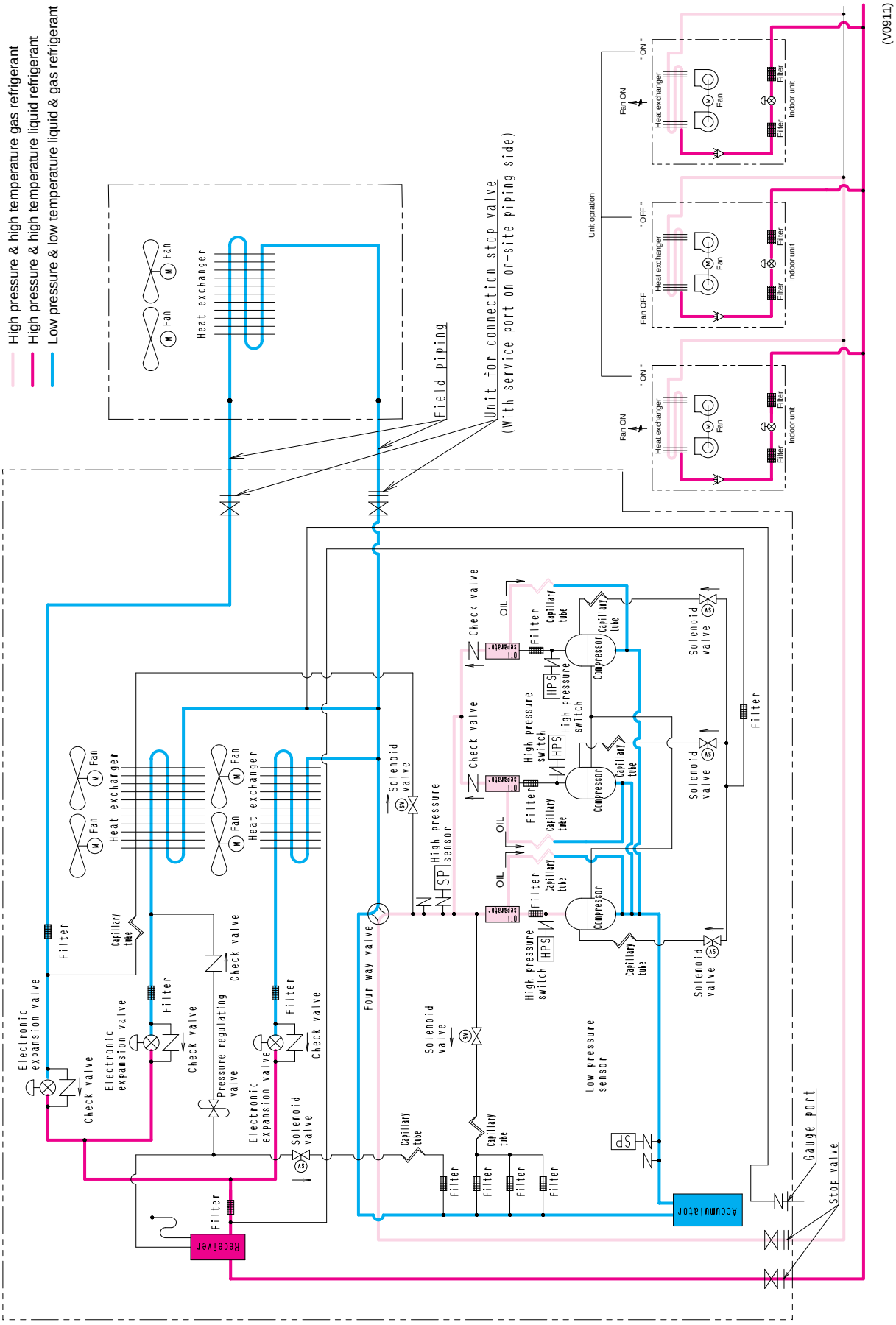


1.2 Flow of Refrigerant in Each Operating Mode

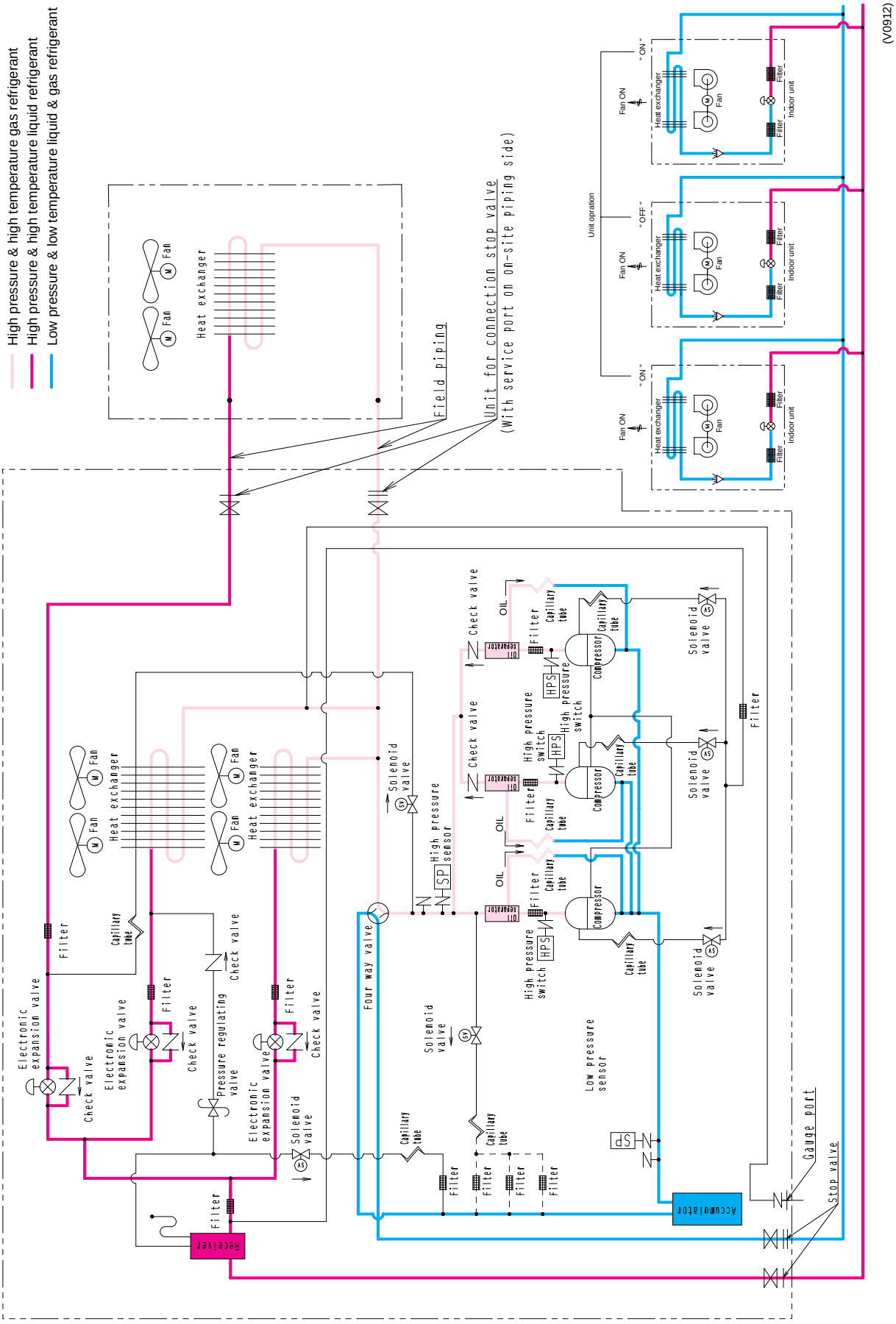
1.2.1 Cooling Operation



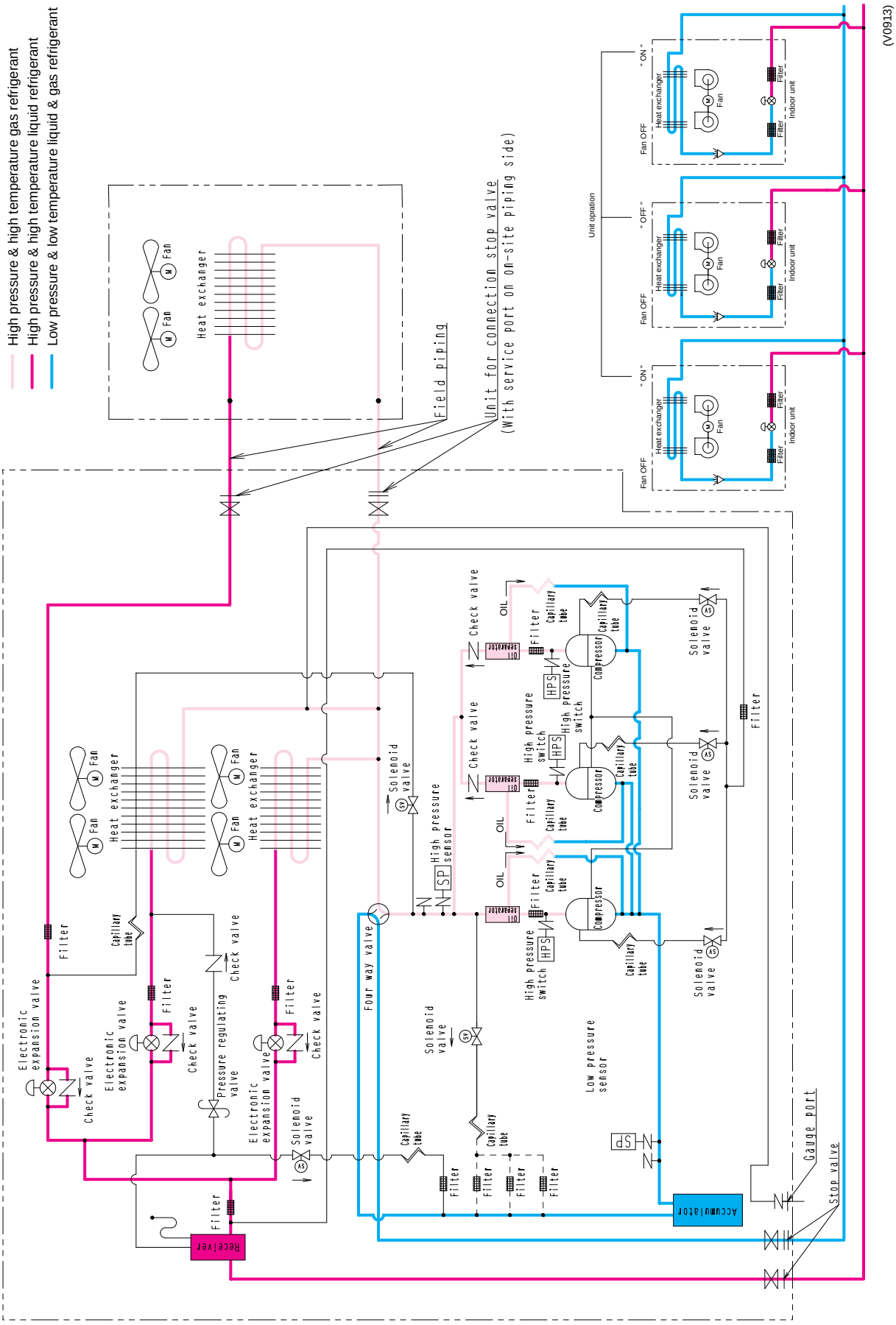
1.2.2 Heating Operation



1.2.3 Oil Return Operation (Cooling)



1.2.4 Oil Return Operation (Heating)



2. List of Safety Device and Function Parts Setting Value

2.1 Outdoor Unit

Item	Name	Symbol	Model						
			PA-16MA1 XPK	PA-18MA1 XPK	PA-20MA1 XPK	PA-24MA1 XPK	PA-26MA1 XPK	PA-28MA1 XPK	PA-30MA1 XPK
Compressor	Inverter Compressor	M1C	JT236DAVTYE@2						
	STD Compressor 1	M2C	JT212DATYE@2		JT265 DATYE @2	JT236DATYE@2		J265 DATYE @2	JT300 DATYE @2
	STD Compressor 2	M3C	—	—	—	JT236DATYE@2		JT265 DATYE @2	JT300 DATYE @2
	Magnetic Relay (Inverter)	K1M	CLK-35J-P6						
	(STD)	K2M	HOE-26F-TRA1B 2	HOE-35F-TRA1B		HOE-26F-TRA1B		HOE-35F-TRA1D	
			18A	20A		18A		22A	
	(STD)	K3M	—	—	—	CLK-50JT-P12			
						18A		22A	
	Crankcase Heater	J1~3HC	50W×2	50W×2	50W×2	50W×3	50W×3	50W×3	50W×3
Fan Motor	Fan Motor (Setting temperature of temperature switch)	M1F	140W 120±5°c						
		M2F	230W 135±5°c						
		M3F	140W 125±5°c						
		M4F	230W 135±5°c						
		M11F	—	—	—	140W 120±5°c			
		M12F	—	—	—	230W 135±5°c			
		M21F	—	—	—	140W 120±5°c			
		M22F	—	—	—	230W 135±5°c			
Functional Parts	Electronic Expansion Valve	Y1·2E	During cooling operating : 2000pls, Stop : 0pls (Fully closed) During heating operating : PI control, Stop : 0pls (Fully closed)						
		Y3E	—	—	—	During cooling operating : 2000pls, Stop : 0pls (Fully closed) During cooling operating : PI control, Stop : 0pls (Fully closed)			
	Solenoid Valve	Y1S	(for Auxiliary condenser) NEV202DXF						
		Y2S	(for Hot gas) NEV603DXF						
		Y3S	(for Injection M1C) NEV202DXF						
		Y4S	(for Injection M2C) NEV202DXF						
		Y5S	(for receiver M2C) NEV202DXF						
		Y6S	—	—	—	(for Injection M3C) NEV202DXF			
	4 Way Valve	Y1R	CHV-2501						
Pressure	Pressure Sensor	SENPH	PS8040A (0~3.33MPa)						
		SENPL	PS8040A (0~0.96MPa)						
	Pressure Switch	S1·2PH	20PS-1016 OFF : $3.09^{+0}_{-0.1}$ MPa ON : 2.16±0.1MPa						
		S3PH	—	—	—	20PS-1016 OFF : $3.09^{+0}_{-0.1}$ MPa ON : 2.16±0.1MPa			
	Pressure Regulating Valve		Open at 2.65MPa						
Thermistors	Thermistor (Ambient temp.)	R1T	3.5~360kΩ (20kΩ at 25°C)						
	Thermistor (Coil)	R2T	3.5~360kΩ (20kΩ at 25°C)						
	Thermistor (Discharge)	R3T	3.5~400kΩ (20kΩ at 25°C)						
	Thermistor (header)	R4T	3.5~360kΩ (20kΩ at 25°C)						
	Thermistor (Suction pipe)	R6T	3.5~360kΩ (20kΩ at 25°C)						
Fuses	Fuse (A1P)	F1U·2U	AC250V, 10A						
	Fuse (A3P)	F1U	AC250V, 10A						
	Fuse (A4P)	F1U	—	—	—	AC250V, 10A			
	Fuse (Z1F)	F1U·2U	AC250V, 5A						
	Fusible Plug		Plug head melt at 70~75°C						

2.2 Indoor Unit

Parts Name		Symbol	Model							Remark
			CS-32 UMHPP	CS-40 UMHPP	CS-50 UMHPP	CS-63 UMHPP	CS-80 UMHPP	CS-100 UMHPP	CS-125 UMHPP	
Remote Controller	Wired Remote Controller		CZ-01RT11P							Option
	Wireless Remote Controller		CZ-01RWU12P							Option
Motors	Fan Motor	M1F	AC 220~240V 45W 6P					AC 230V 90W 6P		
			Thermal protector 130°C : OFF 80°C : ON							
	Motor for Drain Pump	M1P	AC220-240V (50Hz) AC220V (60Hz) Thermal Fuse 145°C							
	Swing Motor	M1S	MP35HCA[3P007482-1] Stepping Motor DC16V							
Thermistors	Thermistor (Suction Air)	R1T	ST8601-1 ϕ4 L250 20kΩ (25°C)							
	Thermistor (for Heat Exchanger High Temp.)	R3T	ST8605-4 ϕ8 L800 20kΩ (25°C)							
	Thermistor (Heat Exchanger)	R2T	ST8602-4 ϕ6 L800 20kΩ (25°C)							
Others	Float Switch	33H	FS-0211							
	Fuse	F1U	250V 5A ϕ5.2							
	Thermal Fuse	TFu	109°C 10A							
	Transformer	T1R	TR22M21R8							

Parts Name		Symbol	Model								Remark
			CS-20 LMHPP	CS-25 LMHPP	CS-32 LMHPP	CS-40 LMHPP	CS-50 LMHPP	CS-63 LMHPP	CS-80 LMHPP	CS-125 LMHPP	
Remote Controller	Wired Remote Controller		CZ-01RT11P								Option
	Wireless Remote Controller		CZ-01RWL12P								Option
Motors	Fan Motor	M1F	AC 220~240V 50Hz								
			1ϕ10W	1ϕ15W		1ϕ20W		1ϕ30W	1ϕ50W	1ϕ85W	
			Thermal Fuse 152°C				—	Thermal protector 135°C : OFF 87°C : ON			
	Motor for Drain Pump	M1P	AC220-240V (50Hz) Thermal Fuse 169°C								
	Swing Motor	M1S	MT8-L[3PA07509-1] AC200~240V								
Thermistors	Thermistor (Suction Air)	R1T	ST8601-16 ϕ4 L1250 20kΩ (25°C)								
	Thermistor (for Heat Exchanger High Temp.)	R3T	ST8605-6 ϕ8 L1250 20kΩ (25°C)								
	Thermistor (Heat Exchanger)	R2T	ST8602-5 ϕ6 L1000 20kΩ (25°C)								
Others	Float Switch	33H	FS-0211								
	Fuse	F1U	250V 5A ϕ5.2								
	Transformer	T1R	TR22M21R8								

Parts Name		Symbol	Model				Remark
			CS-25DM1HPK	CS-32DM1HPK	CS-40DM1HPK	CS-63DM1HPK	
Remote Controller	Wired Remote Controller		CZ-01RT11P				Option
Motors	Fan Motor	M1F	AC 220~240V 50Hz				
			1ϕ15W 4P		1ϕ20W 4P	1ϕ45W 4P	
			Thermal Fuse 146°C		Thermal protector 120°C : OFF 105°C : ON		
	Motor for Drain Pump	M1P	AC 220-240V (50Hz) Thermal Fuse 145°C				
	Swing Motor	M1S	MT8-L[3PA07312-1] AC200~240V				
Thermistors	Thermistor (Suction Air)	R1T	ST8601-13 ϕ4 L630 20kΩ (25°C)				
	Thermistor (for Heat Exchanger High Temp.)	R3T	ST8605-7 ϕ8 L1600 20kΩ (25°C)				
	Thermistor (Heat Exchanger)	R2T	ST8602A-7 ϕ6 L1600 20kΩ (25°C)				
Others	Float Switch	33H	FS-0211				
	Fuse	F1U	250V 5A ϕ5.2				
	Transformer	T1R	TR22M21R8				

Parts Name		Symbol	Model									Remark
			CS-20 FMHPP	CS-25 FMHPP	CS-32 FMHPP	CS-40 FMHPP	CS-50 FMHPP	CS-63 FMHPP	CS-80 FMHPP	CS-100 FMHPP	CS-125 FMHPP	
Remote Controller	Wired Remote Controller		CZ-01RT11P									Option
Motors	Fan Motor	M1F	AC 220~240V 50Hz									
			1φ50W			1φ65W	1φ85W	1φ125W	1φ135W		1φ225W	
			Thermal Fuse 152°C						Thermal protector 135°C : OFF 87°C : ON			
	Motor for Drain Pump	M1P	AC220-240V (50Hz) Thermal Fuse 169°C									
Thermistors	Thermistor (Suction Air)	R1T	ST8601-4 φ4 L800 20kΩ (25°C)									
	Thermistor (for Heat Exchanger High Temp.)	R3T	ST8605-7 φ8 L1600 20kΩ (25°C)									
	Thermistor (Heat Exchanger)	R2T	ST8602-6 φ6 L1250 20kΩ (25°C)									
Others	Float Switch	33H	FS-0211									
	Fuse	F1U	250V 10A φ5.2									
	Thermal Fuse	TFu	109°C 10A									
	Transformer	T1R	TR22M21R8									

Parts Name		Symbol	Model								Remark
			CS-40 EMHPK	CS-50 EMHPK	CS-63 EMHPK	CS-80 EMHPK	CS-100 EMHPK	CS-125 EMHPK	CS-200 EMHPK	CS-250 EMHPK	
Remote Controller	Wired Remote Controller		CZ-01RT11P								Option
Motors	Fan Motor	M1F	AC 220~240V 50Hz								
			1φ100W		1φ160W	1φ270W		1φ430W	1φ380W×2		
			Thermal protector 135°C : OFF 87°C : ON								
	Capacitor for Fan Motor	C1R	6μ F-400V		10μ F-400V				10μ F-400V	12μ F-400V	
Thermistors	Thermistor (Suction Air)	R1T	ST8601-5 φ4 L1000 20kΩ (25°C)						ST8601-13 φ4 L630		
	Thermistor (for Heat Exchanger High Temp.)	R3T	ST8605-5 φ8 L1000 20kΩ (25°C)						ST8605-5 φ8 L1000		
	Thermistor (Heat Exchanger)	R2T	ST8602-5 φ6 L1000 20kΩ (25°C)						ST8602A-6 φ6 L1250		
Others	Fuse	F1U	250V 10A φ5.2						250V 10A		
	Transformer	T1R	TR22M21R8						TR22M21R8		

Parts Name		Symbol	Model			Remark
			CS-32TMJPL	CS-63TMJPL	CS-100TMJPL	
Remote Controller	Wired Remote Controller		CZ-01RT11P			Option
	Wireless Controller		BRC7C63W·68W			
Motors	Fan Motor	M1F	AC 220~240V 50Hz			
			1φ57W		1φ130W	
			Thermal protector 130°C : OFF 80°C : ON			
	Capacitor for Fan Motor	C1R	4μF-400V		6μF-400V	
	Swing Motor	M1S	MT8-L[3PA07530-1] AC200~240V			
Thermistors	Thermistor (Suction Air)	R1T	ST8601-11 φ4 L250 20kΩ (25°C)			
	Thermistor (for Heat Exchanger High Temp.)	R3T	ST8605-7 φ8 L1600 20kΩ (25°C)		ST8605-8 φ8 L2000 20kΩ (25°C)	
	Thermistor (Heat Exchanger)	R2T	ST8602A-7 φ6 L1600 20kΩ (25°C)		ST8602-8 φ6 L2000 20kΩ (25°C)	
Others	Fuse	F1U	250V 5A φ5.2			
	Transformer	T1R	TR22M21R8			

Parts Name		Symbol	Model						Remark
			CS-20KM1HPK	CS-25KM1HPK	CS-32KM1HPK	CS-40KM1HPK	CS-50KM1HPK	CS-63KM1HPK	
Remote Controller	Wired Remote Controller		CZ-01RT11P						Option
	Wireless Remote Controller		CZ-01RWK12P						Option
Motors	Fan Motor	M1F	AC 220~240V 50Hz						
			1φ23W				1φ37W		
			Thermal protector 130°C : OFF 80°C : ON						
	Capacitor for Fan Motor	C1R	1.5μF-400V				2μF-400V		
	Swing Motor	M1S	MT8-L[3SB40350-2] AC200~240V						
Thermistors	Thermistor (Suction Air)	R1T	ST8601-4 φ4 L800 20kΩ (25°C)						
	Thermistor (for Heat Exchanger High Temp.)	R3T	ST8605-4 φ8 L800 20kΩ (25°C)						
	Thermistor (for Heat Exchanger)	R2T	ST8602-4 φ6 L800 20kΩ (25°C)						
Others	Float Switch	33H	FS-0211						
	Fuse	F1U	250V 10A φ5.2						
	Transformer	T1R	TR22M21R8						

Parts Name		Symbol	Model						Remark
			CS-20PM1HPK	CS-25PM1HPK	CS-32PM1HPK	CS-40PM1HPK	CS-50PM1HPK	CS-63PM1HPK	
Remote Controller	Wired Remote Controller		CZ-01RT11P						Option
Motors	Fan Motor	M1F	AC 220~240V 50Hz						
			1φ15W		1φ25W		1φ45W		
			Thermal protector 135°C : OFF 120°C : ON						
	Capacitor for Fan Motor	C1R	1.2μF-400V		0.5μF-400V	1.2μF-400V	2μF-400V	2.5μF-400V	
Thermistors	Thermistor (Suction Air)	R1T	ST8601-6 φ4 L1250 20kΩ (25°C)						
	Thermistor (for Heat Exchanger High Temp.)	R3T	ST8605-9 φ8 L2500 20kΩ (25°C)						
	Thermistor (for Heat Exchanger)	R2T	ST8602-9 φ6 L2500 20kΩ (25°C)						
Others	Fuse	F1U							
	Transformer	T1R	TR22M21R8						

Parts Name		Symbol	Model						Remark
			CS-20RM1HPK	CS-25RM1HPK	CS-32RM1HPK	CS-40RM1HPK	CS-50RM1HPK	CS-63RM1HPK	
Remote Controller	Wired Remote Controller		CZ-01RT11P						Option
Motors	Fan Motor	M1F	AC 220~240V 50Hz						
			1φ15W		1φ25W		1φ45W		
			Thermal protector 135°C : OFF 120°C : ON						
	Capacitor for Fan Motor	C1R	1.2μF-400V		0.5μF-400V	1.2μF-400V	2μF-400V	2.5μF-400V	
Thermistors	Thermistor (Suction Air)	R1T	ST8601-6 φ4 L1250 20kΩ (25°C)						
	Thermistor (for Heat Exchanger High Temp.)	R3T	ST8605-9 φ8 L2500 20kΩ (25°C)						
	Thermistor (for Heat Exchanger)	R2T	ST8602-9 φ6 L2500 20kΩ (25°C)						
Others	Fuse	F1U							
	Transformer	T1R	TR22M21R8						

3. Outline of Control

3.1 Outdoor Unit

3.1.1 Compressor PI Control

Controls the compressor to maintain Te at constant during cooling operation and Te at constant during heating operation to ensure stable compressor performance.

[Cooling operation]

Controls compressor capacity to adjust Te to achieve target value (TeS).

Te setting

L	M (factory setting)	H
4.5	7.5	10.5

Te: Low pressure equivalent saturation temperature (°C)

TeS: Target Te value

(Varies depending on Te setting, operating frequency, etc.)

[Heating operation]

Controls compressor capacity to adjust Tc to achieve target value (TcS)

Tc setting

L	M (factory setting)	H
45	48	51

Tc: High pressure equivalent saturation temperature (°C)

TcS: Target Tc value

(Varies depending on Tc setting, operating frequency, etc.)

3.1.2 Motorized Valve PI Control

Controls the motorized valves (EV1, EV2, EV3) to maintain the outlet superheated degree (SH) of the outdoor heat exchanger (evaporator) at constant during heating operation.

SH = Th6 – Te

Te: Low pressure equivalent saturation temperature (°C)

Th6: Accumulator outlet temperature (°C)

Superheated degree target value (SHS)

- Initial value at the start of motorized valve control: SHS = 5 °C
- When Th6 – Te < 5: SHS (new) = SHS (current) + 1
  However, when Th6 – Te < 5 and DSHi < 30: SHS = 7 °C (fixed)
- When Th6 – Te > 10: SHS (new) = SHS (current) – 1

DSHi: Inverter discharge pipe superheat

3.1.3 Defrost Control

Activates the defrosting operation to melt frost accumulated on the outdoor heat exchanger during heating operation.

[Defrost start conditions]

When the following conditions are met during heating operation, the defrosting operation is activated.

OR	**&**	When cumulative compressor operating time from power On or completion of previous defrosting operation exceeds 20 minutes
		When condition (Tb ≤ B × Ta – A) remains for 5 minutes (–25 ≤ Tb ≤ –10) (Value of A based on the following table. When Ta ≥ 7, Ta = 7°C is used in calculation)
	When forced defrost setting (local setting) is turned on and Tb < 12.5°C	

Tb : Distributor pipe temperature (°C) at heat exchanger outlet (in cooling operation)

Ta : Outside temperature (°C)

Defrost setting	Defrost change setting		
	L	M	H
No-setting (Factory set)	A=12	A=14	A=16

	B
Outside air Ta > 0°C	0.6
Outside air Ta ≤ 0°C	0.8

When the above conditions are met, the following “defrosting operation preparation” operation is conducted for 2 minutes, then the defrosting operation is activated.

1. Outputs “oil return, defrost preparation” signal to indoor units.
2. Turns on the liquid injection solenoid valve (SVT) based on Td or DSH.

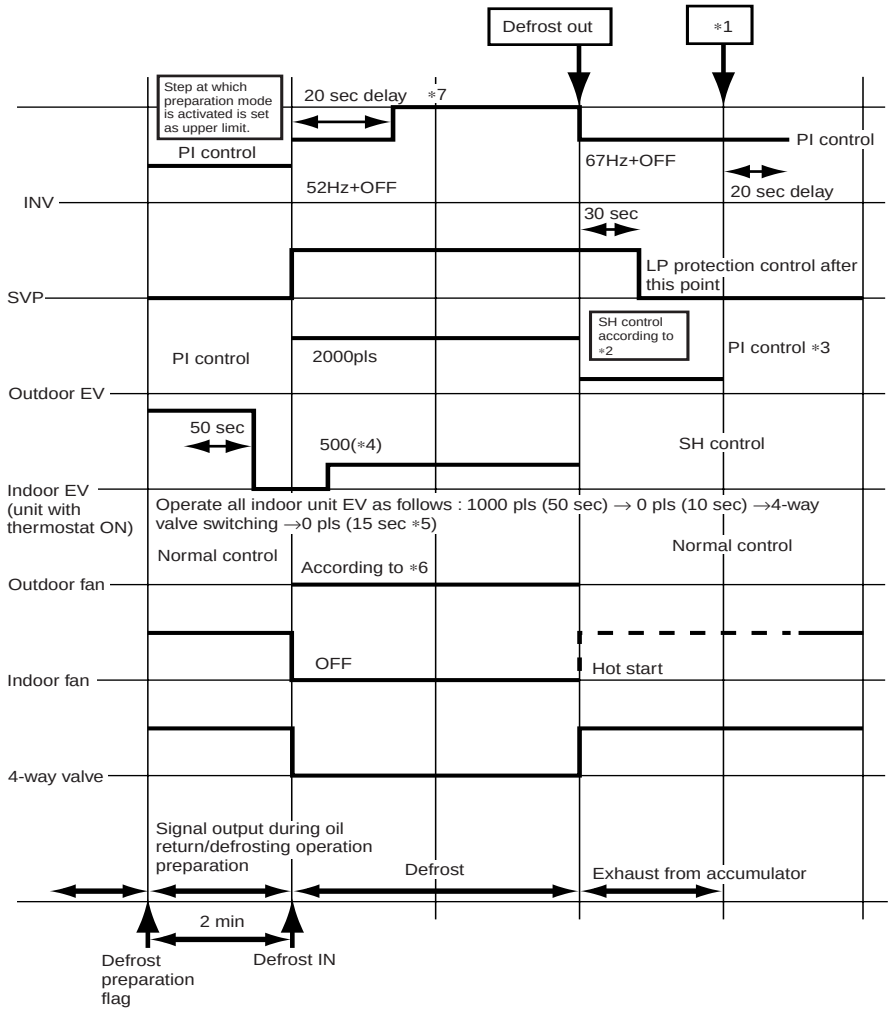
Td : Discharge pipe temperature

DSH : Discharge super heat temp.

∗Liquid injection : Refer to page 440.

[Defrosting operation]

The defrosting operation provides the following control functions.



∗1
Accumulator discharge operation ending conditions

OR
- Elapsed time of 10 minutes
- & 1 minute or more after completion of defrosting operation
  - OR DSHi>30
  - OR Th6 – Te>10
  - OR LP<0.1MPa

∗2
SH control by outdoor unit EV
PI control activated when SHS = 10 (initial opening degree: 200 pls
In the case of an LP retry, the next PI control is provided at SHS = 5.
When condition ∗1 is met, the next startup condition is reset to SHS = 10.)

∗3
When returning to normal outdoor EV control, the PI control is provided at that opening degree.

∗4
Opening degree of indoor unit EV during defrosting operation
- Initial value: 500
- Next indoor unit EV opening degree (200-2000) is determined based on (Th6 – Te < 15) appearing time in previous defrosting operation

0 minute → +100
Less than 3 minutes → +0
3 minutes or more → –100

∗5
0 pls maintained after elapsed time of 15 seconds until LP < 0.2 MPa

∗6
Opens receiver solenoid valve for 60 seconds at 1 minute after the preparation mode is activated.
However, the valve is closed when Th6 – Te < 0.

∗7

CU-8MA1XPK	52Hz + ON
CU-10MA1XPK	71Hz + ON
CU-16, 20MA1XPK	52Hz + ON + ON

(V0807)

[Defrosting operation ending conditions]

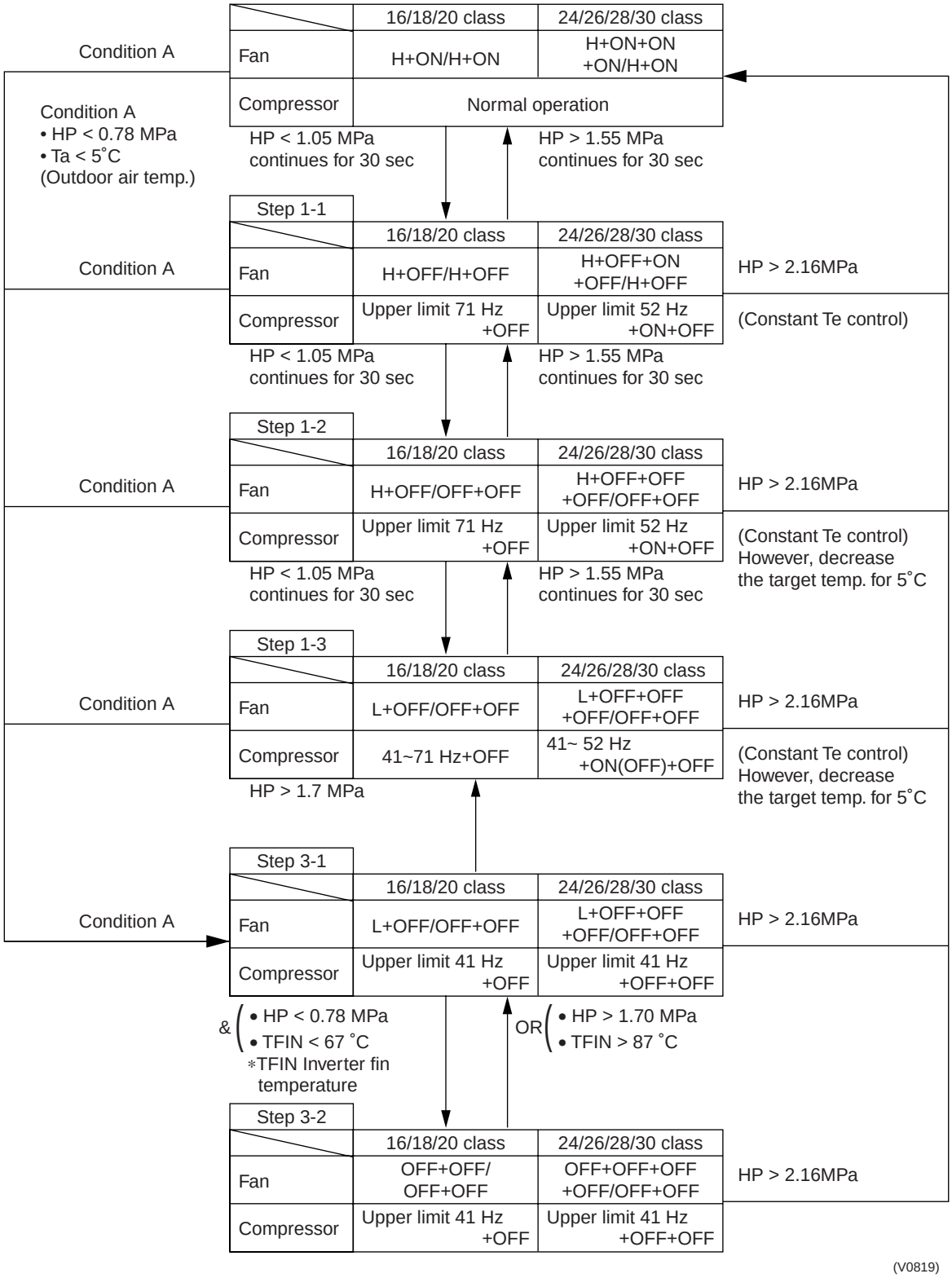
When the following conditions are met, the defrosting operation ends.

OR	When distribution pipe temperatures at all heat exchanger outlets (during cooling operation) are as follows: Tb > 12.5°C
	When defrosting operation is conducted for 10 minutes

However, when the compressor stops during a defrosting operation, if condition (Tb > 12.5°C) is not met at the next compressor startup, the defrosting operation starts and a 10-minute counter is activated when the software startup is completed.

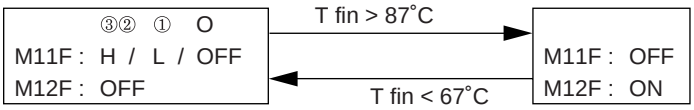
3.1.4 Low Outside Temperature Cooling Control

Controls the outdoor unit fans and compressors to prevent refrigerant circulation from decreasing due to lowering of high pressure and to maintain high pressure when the outside temperature is low during cooling operation.



(V0819)

- When condition (Th6 – Te < 5) remains for 3 continuous minutes in steps higher than step 1-2, EVs of all indoor units in thermostat-OFF status are set to 200 pls. This is canceled when Th6 – Te > 15. (for prevention of wet operation in cooling operation when outside temperature is low)
  Th6 – Te: Suction pipe temperature – Evaporation temperature
- From 24 HP model or higher, the fan (M12F) on the inverter box side stops if operating at fan tap (3) or lower. Therefore, Tfin switches M11F OFF and M12F ON.



(V0820)

- In this control, the compressor load increase based on PI calculation is conducted once every 2 minutes. The load decrease operation is conducted once every 20 minutes.

∗ Tfin: Inverter fin temperature.

3.1.5 Compressor Capacity Control

INV Compressor Operating Frequency

The operating frequency changes in the following steps.

■ **PA-16·18·20MA**

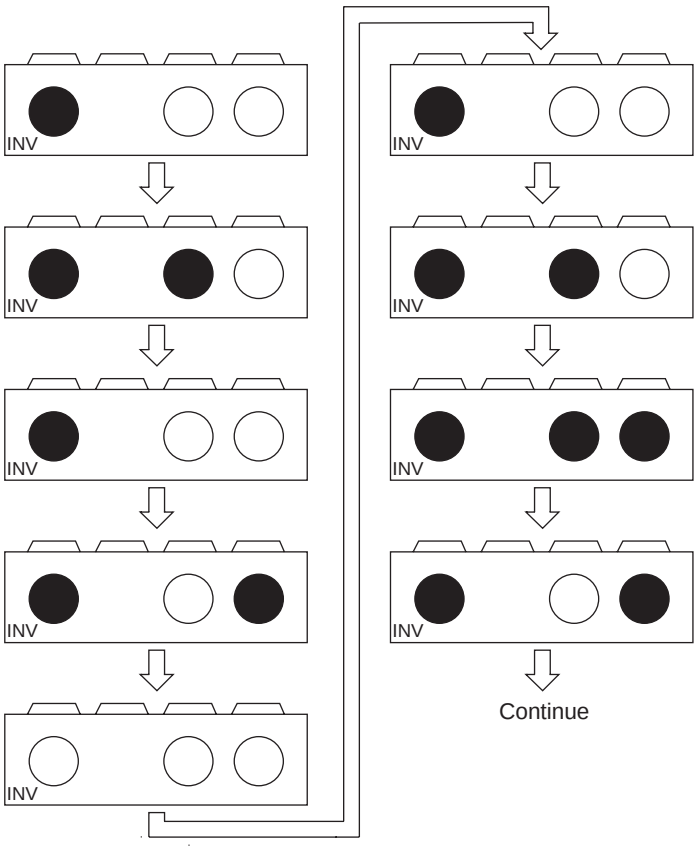
NO.	Frequency	
	INV	STD
1	29Hz	OFF
2	31Hz	OFF
3	33Hz	OFF
4	35Hz	OFF
5	37Hz	OFF
6	39Hz	OFF
7	41Hz	OFF
8	43Hz	OFF
9	46Hz	OFF
10	48Hz	OFF
11	52Hz	OFF
12	55Hz	OFF
13	58Hz	OFF
14	62Hz	OFF
15	64Hz	OFF
16	67Hz	OFF
17	71Hz	OFF
18	75Hz	OFF
19	37Hz	ON
20	41Hz	ON
21	46Hz	ON
22	52Hz	ON
23	58Hz	ON
24	64Hz	ON
25	71Hz	ON
26	79Hz	ON

■ **PA-24~30MA**

NO.	Frequency		
	INV	STD1	STD2
1	29Hz	OFF	OFF
2	31Hz	OFF	OFF
3	33Hz	OFF	OFF
4	35Hz	OFF	OFF
5	37Hz	OFF	OFF
6	39Hz	OFF	OFF
7	41Hz	OFF	OFF
8	43Hz	OFF	OFF
9	46Hz	OFF	OFF
10	48Hz	OFF	OFF
11	52Hz	OFF	OFF
12	55Hz	OFF	OFF
13	58Hz	OFF	OFF
14	62Hz	OFF	OFF
15	64Hz	OFF	OFF
16	67Hz	OFF	OFF
17	71Hz	OFF	OFF
18	75Hz	OFF	OFF
19	37Hz	ON	OFF
20	41Hz	ON	OFF
21	46Hz	ON	OFF
22	52Hz	ON	OFF
23	58Hz	ON	OFF
24	64Hz	ON	OFF
25	71Hz	ON	OFF
26	41Hz	ON	ON
27	52Hz	ON	ON
28	64Hz	ON	ON
29	79Hz	ON	ON

Compressor Sequence Operation

Regarding operation of STD compressors in 3 compressor system, STD1 and STD2 are switched under following condition.



(V0914)

STD Compressor Operation

Since ON/OFF switching of STD compressors causes a sudden change in the capacity, therefore the following operation is conducted.

[When STD compressor is turned on]

- When a STD compressor changes from OFF to ON due to the compressor PI control or others, 41 Hz + ON (+ON) is fixed for 30 seconds.
- Regarding the above operation timing, the inverter compressor is set to the above frequency (41 Hz) first, then the STD compressor is started.
  (Operation starts when frequency matching signal from inverter is received.)
- The STD compressor does not start for 3 seconds if the STD compressor of another outdoor units starts.

[When STD compressor is turned off]

- The frequency of the inverter compressor changes after the STD compressor stops operation.

3.1.6 Demand Control

Forcibly reduces the outdoor unit capacity based on an external contact input (demand input) to decrease power consumption. The following three types of demand control are provided.

	Compressor upper-limit frequency	Capacity reduction guideline
Demand control 1	A	Reduces power consumption to approx. 70%
Demand control 2	B	Reduces power consumption to approx. 40%
Demand control 3	All compressors in stop mode	Forced thermostat OFF

Model	Upper-limit frequency (A)		
	INV	STD1	STD2
PA-16MA1XPK	46Hz	+ON	—
PA-18MA1XPK	52Hz	+ON	—
PA-20MA1XPK	52Hz	+ON	—
PA-24MA1XPK	71Hz	+ON	+OFF
PA-26MA1XPK	71Hz	+ON	+OFF
PA-28MA1XPK	71Hz	+ON	+OFF
PA-30MA1XPK	71Hz	+ON	+OFF

Model	Upper-limit frequency(B)		
	INV	STD1	STD2
PA-16MA1XPK	52Hz	+OFF	—
PA-18MA1XPK	62Hz	+OFF	—
PA-20MA1XPK	62Hz	+OFF	—
PA-24MA1XPK	75Hz	+OFF	+OFF
PA-26MA1XPK	75Hz	+OFF	+OFF
PA-28MA1XPK	75Hz	+OFF	+OFF
PA-30MA1XPK	75Hz	+OFF	+OFF

■ Other protection control functions have precedence over the above operations.

∗ Optional PCB is required for this control. (DTA104A61, 62)

3.1.7 Restart Standby

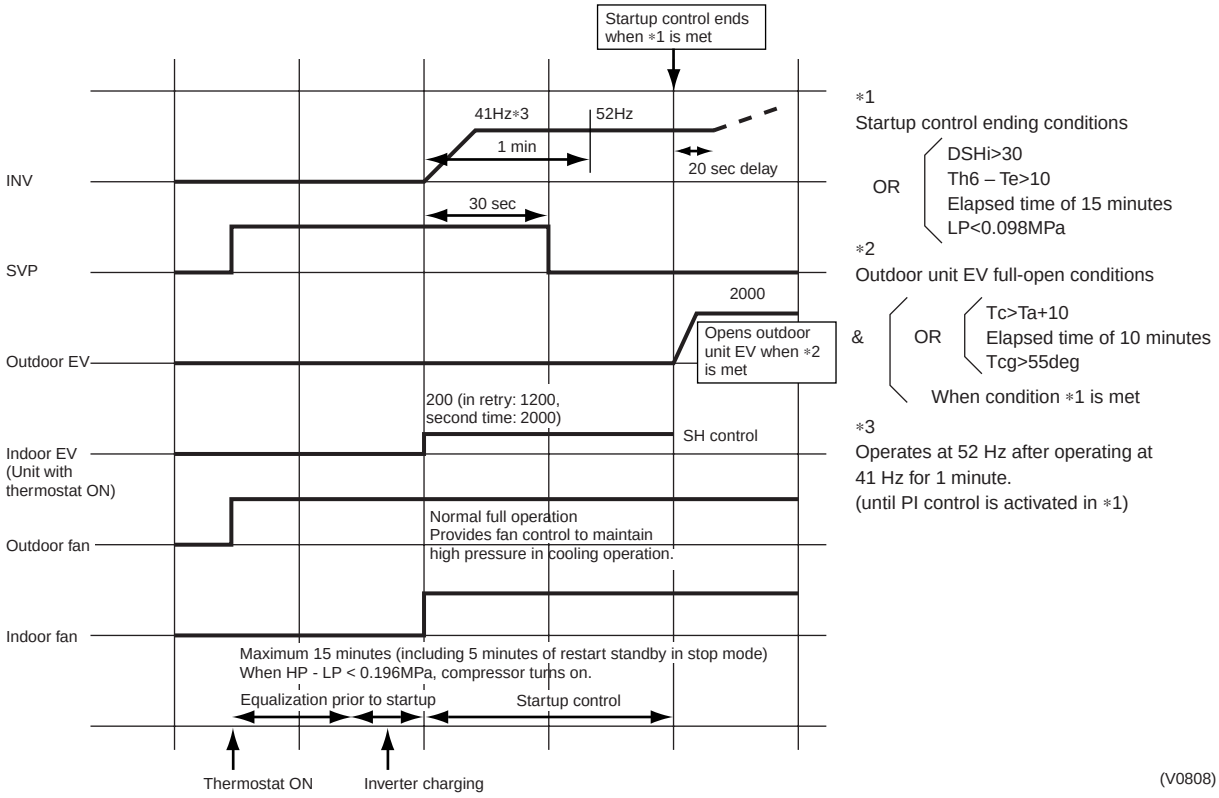
Prevents compressor startup for a certain period of time once compressors stop operating, in order to prevent frequent ON/OFF operations of compressors.

When all compressors (inverter compressor and STD compressors) stop operating, the thermostats remain in forced OFF condition for 5 minutes.

3.1.8 Startup Control

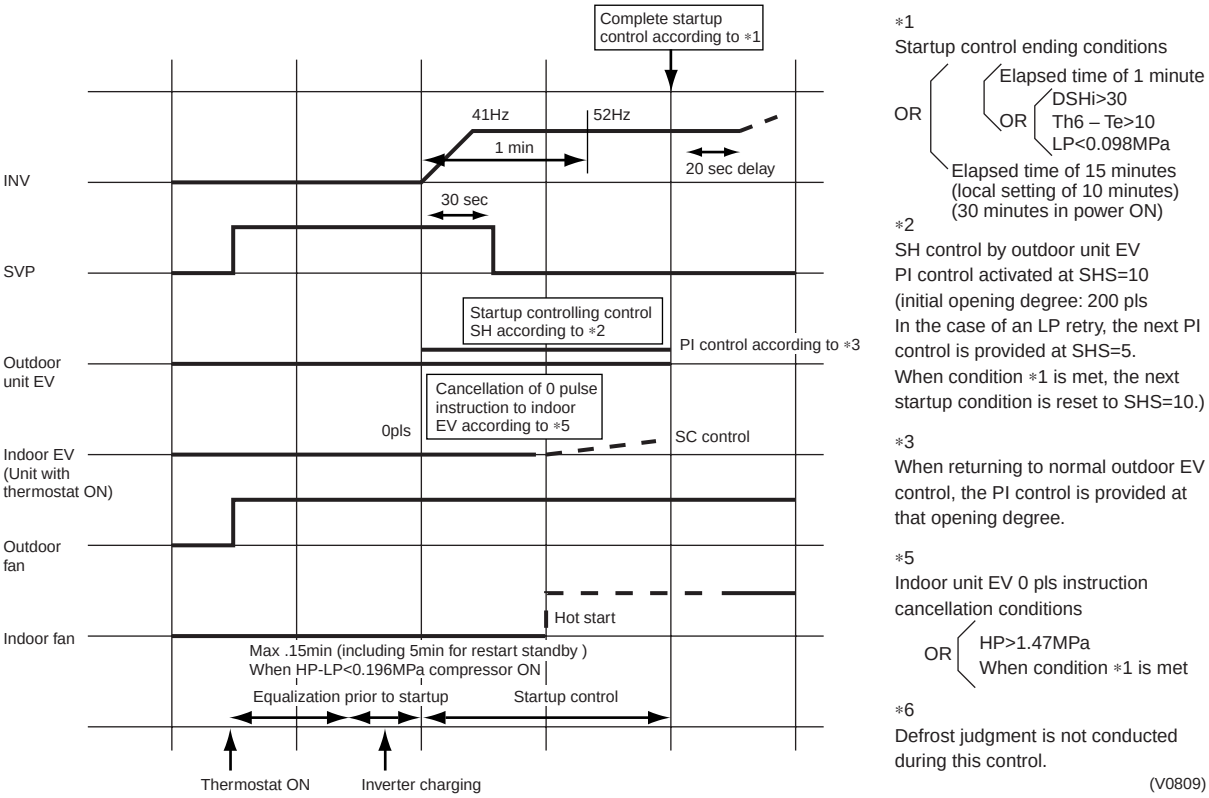
Fixes the frequency at a low level for a certain period of time during compressor startup to prevent liquid return.

[Startup control in cooling operation]



(V0808)

[Startup control in heating mode]



(V0809)

3.1.9 Oil Equalization Operation

Conducts oil equalization operation at certain time intervals to prevent insufficient oil supply due to uneven oil distribution when two or three compressors are connected in parallel.

[For 16~20HP model units]

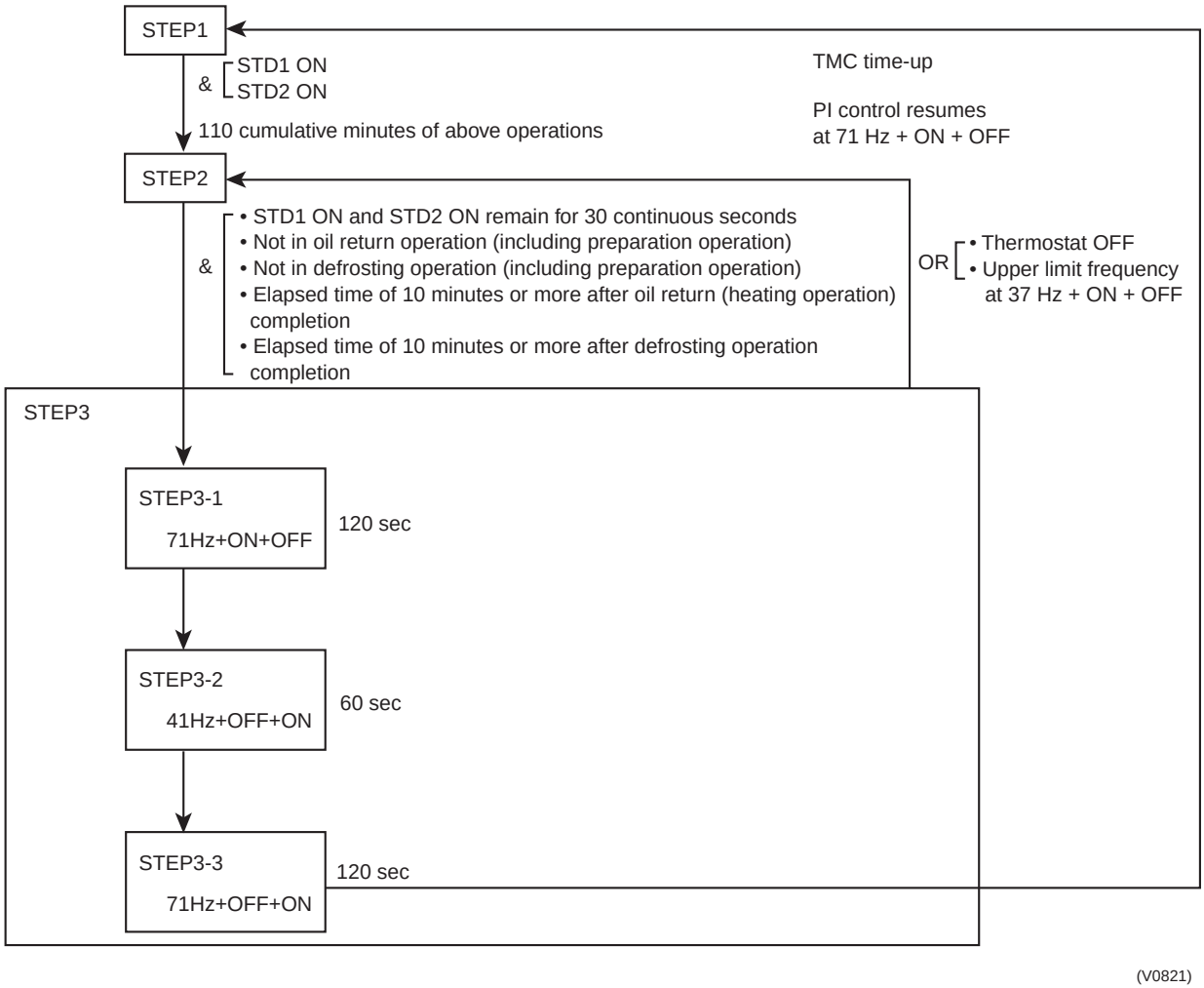
- The following oil equalization operation is conducted after two STD compressors operates for 2 continuous hours.
- Oil equalization operation --- Upper-limit frequency is controlled to the following value.

	2 min	2 min
16~20HP model	62Hz+OFF	37Hz+ON

* The oil equalization operation is not activated during soft start, oil return operation and defrosting operation (including defrosting operation preparation) and for 10 minutes after the completion of defrosting operation and oil return (heating operation).

[For 24~30 class units]

- The oil equalization operation is conducted in the following steps.



(V0821)

3.1.10 Oil Return Operation

Activates the oil return operation to collect refrigerant oil from the field pipes when the following conditions are met.

[Start conditions]

1. When cumulative compressor operating time from power ON exceeds 2 hours
2. When cumulative compressor operating time from completion of previous return operation exceeds 8 hours.
   However, when the upper-limit frequency is limited to less than “A” Hz during the previous oil return operation, the above time period of 8 hours is changed to 4 hours.

∗1) When defrost control operation for more than 4 minutes with inverter compressor frequency of “A”Hz or higher, oil return time reset to 8 hours.

2) When condition 1. or 2. is satisfied during heating operation, the electric heaters of indoor units are turned off 2 minutes prior in order to prepare for the oil return operation.

3) The oil return operation is not activated for 28 minutes after the completion of the previous defrosting operation.

[Oil return operation]

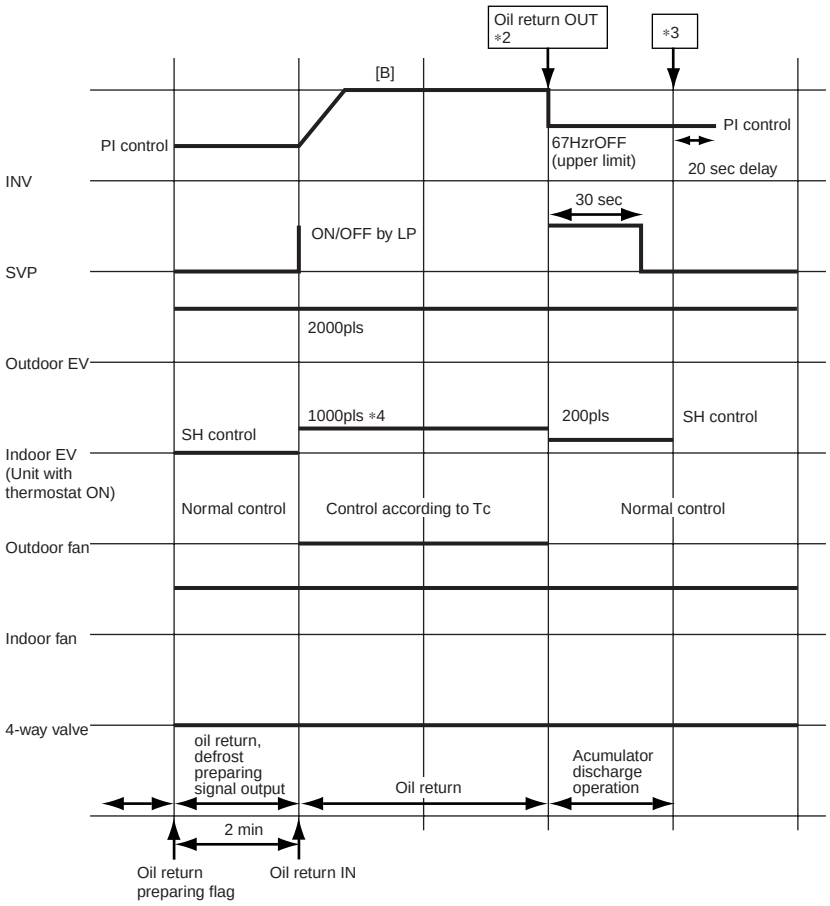
■ The compressor operating frequency is set to “B” Hz shown in the following table.

[Ending conditions]

■ The oil return operation ends after 1~8 minutes of operation. However, when the compressor stop conditions are met during an oil return operation, the compressor stops after the completion of the oil return operation.
   When the compressor stops during an oil return preparation operation, the oil return operation is activated at the next startup.

	A			B		
	INV	STD1	STD2	INV	STD1	STD2
PA-16MA1XPK	33Hz	ON	—	52Hz	ON	—
PA-18MA1XPK	41Hz	ON	—	71Hz	ON	—
PA-20MA1XPK	41Hz	ON	—	71Hz	ON	—
PA-24MA1XPK	75Hz	ON	OFF	52Hz	ON	ON
PA-26·28·30MA1XPK	75Hz	ON	OFF	52Hz	ON	ON

[Oil return control (cooling operation)]



∗2
Oil return operation ending conditions

OR
- Elapsed time of 8 minutes
- & (
  - Elapsed time of 1 minute
  - OR (
    - DSHi < 20˚C 10 continuous seconds
    - Th6 – Te < 15˚C 10 continuous seconds
)
)

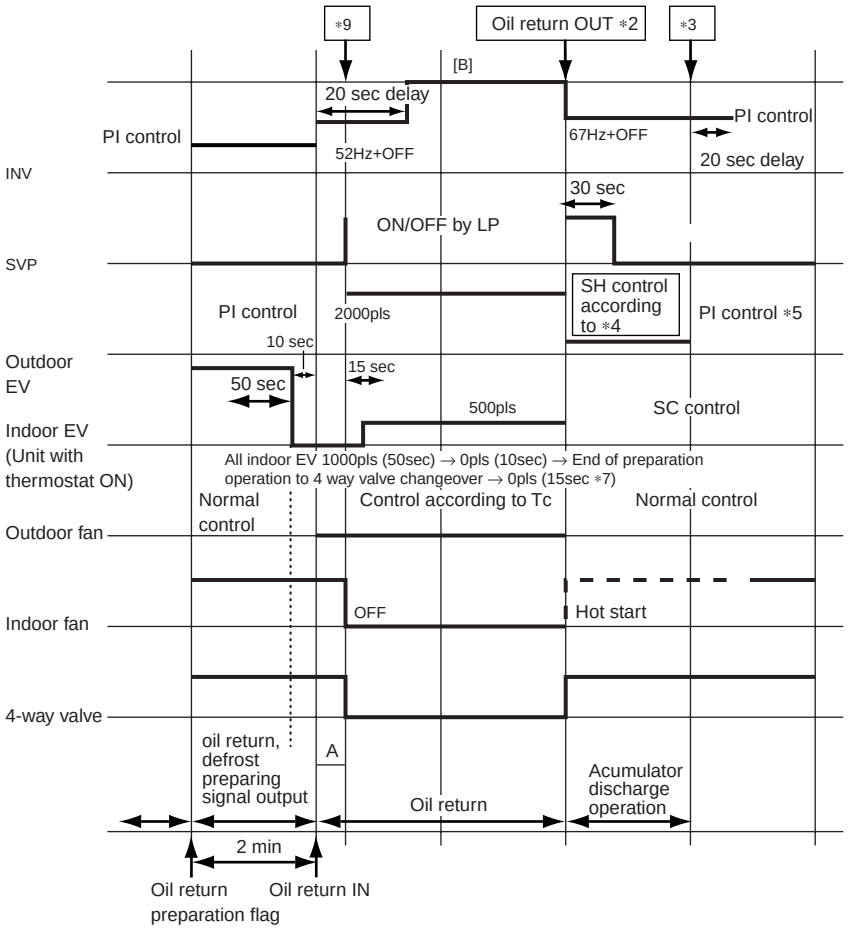
∗3
Accumulator discharge operation ending conditions

OR
- & (
  - Elapsed time of 1 minute after completion of oil return operation
  - OR (
    - DSHi>30
    - Th6 – Te>10
    - LP<0.1MPa
)
)
- Elapsed time of 10 minutes

∗4
Oil return signal only is sent from Outdoor unit.

(V0810)

[Oil return control (heating operation)]



∗2
Oil return operation ending conditions

OR
- Elapsed time of 8 minutes
- & Elapsed time of 2 minutes
  - OR
    - DSHi < 20˚C 10 continuous seconds
    - Th6 – Te < 15˚C 10 continuous seconds

∗3
Accumulator discharge operation ending conditions

OR
- & Elapsed time of 1 minute after completion of oil return operation
  - OR
    - DSHi>30
    - Th6 – Te>10
    - LP<0.1MPa
- Elapsed time of 10 minutes

∗4
LPSH control by outdoor unit EV
PI control activated when SHS = 10
(initial opening degree: 200 pls
In the case of an LP retry, the next PI control is provided at SHS = 5.
When condition ∗3 is met, the next startup condition is reset to SHS = 10.)

∗5
When returning to normal outdoor EV control, the PI control is provided at that opening degree.

∗7
0 pls maintained after elapsed time of 15 seconds until LP < 0.2 MPa

∗8
Opens receiver solenoid valve for 60 seconds 1 minute after the preparation mode is activated. However, the valve is closed when Th6 – Te < 0.

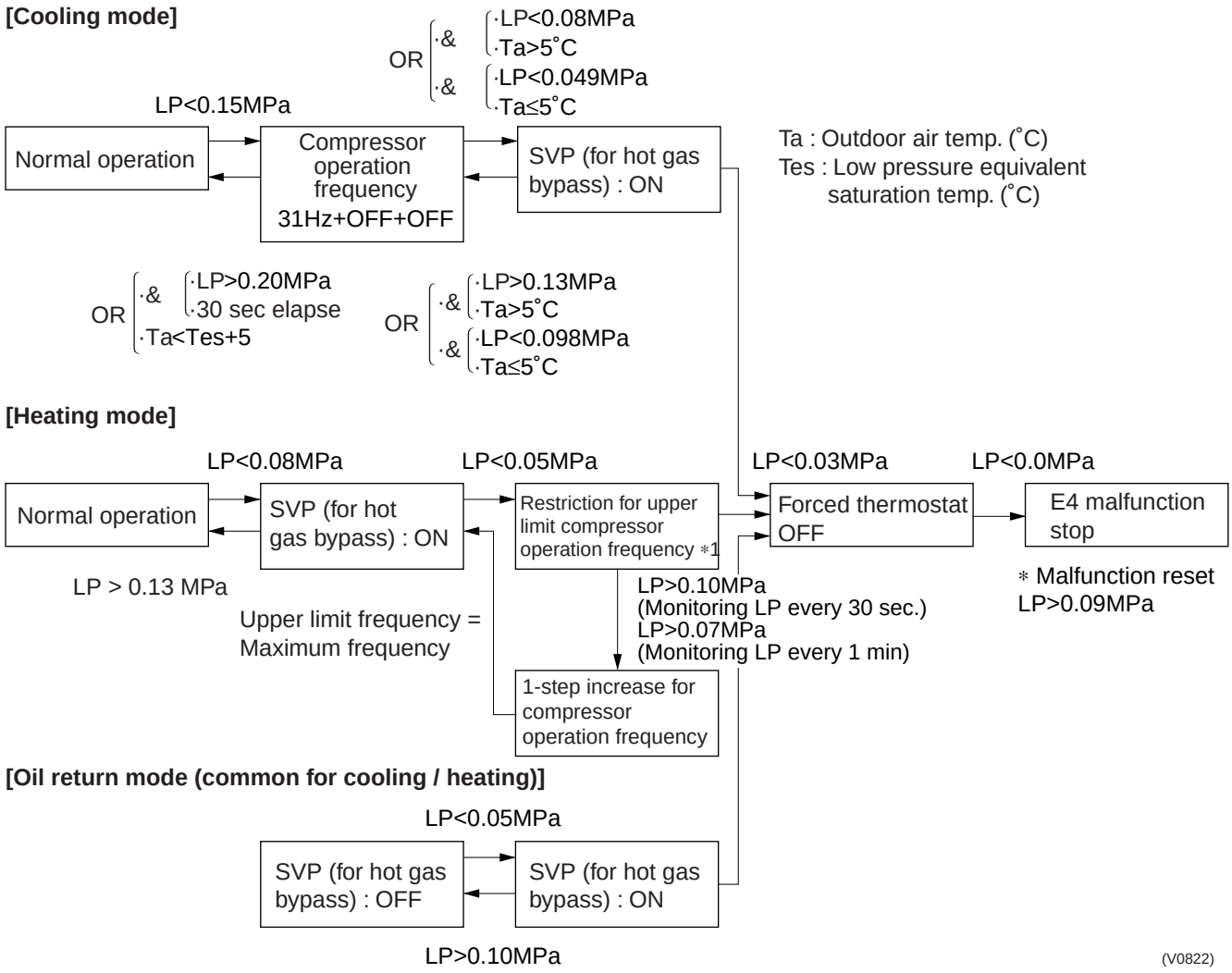
∗9
Completion condition for under preparation of heating oil return.

& 2 min. elapsed
- OR
  - 10 sec. elapsed since preparation end
  - HP-LP<0.5Mpa

(V0811)

3.1.11 Low Pressure Protection Control

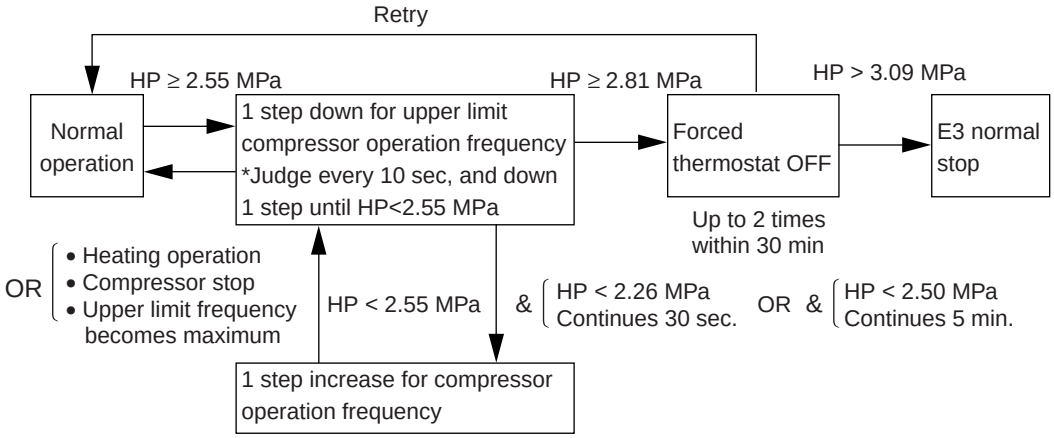
The following control is provided to protect the compressors from abnormal decrease of low pressure (LP).



3.1.12 High Pressure Protection Control

The following control is provided for the compressor operating frequency and others to prevent protection devices from malfunctioning due to abnormal increase of high pressure (HP) and to protect the compressors.

[Cooling mode]


Retry
HP ≥ 2.55 MPa
HP ≥ 2.81 MPa
HP > 3.09 MPa
Normal operation
1 step down for upper limit compressor operation frequency
*Judge every 10 sec, and down 1 step until HP<2.55 MPa
Forced thermostat OFF
E3 normal stop
Up to 2 times within 30 min
OR
• Heating operation
• Compressor stop
• Upper limit frequency becomes maximum
HP < 2.55 MPa
&
HP < 2.26 MPa
Continues 30 sec.
OR &
HP < 2.50 MPa
Continues 5 min.
1 step increase for compressor operation frequency

(V0823)

[Heating mode]

Condition (1)

OR	&	Indoor unit thermostat ON capacity of 8.0 kW (3HP) or less			
		OR	&	Ta ≥ 15°C	
				HP ≥ 2.16MPa	
			&	Ta < 15°C	
				HP ≥ 2.25MPa	
	HP≥2.37MPa				

Condition (2) (During soft start)

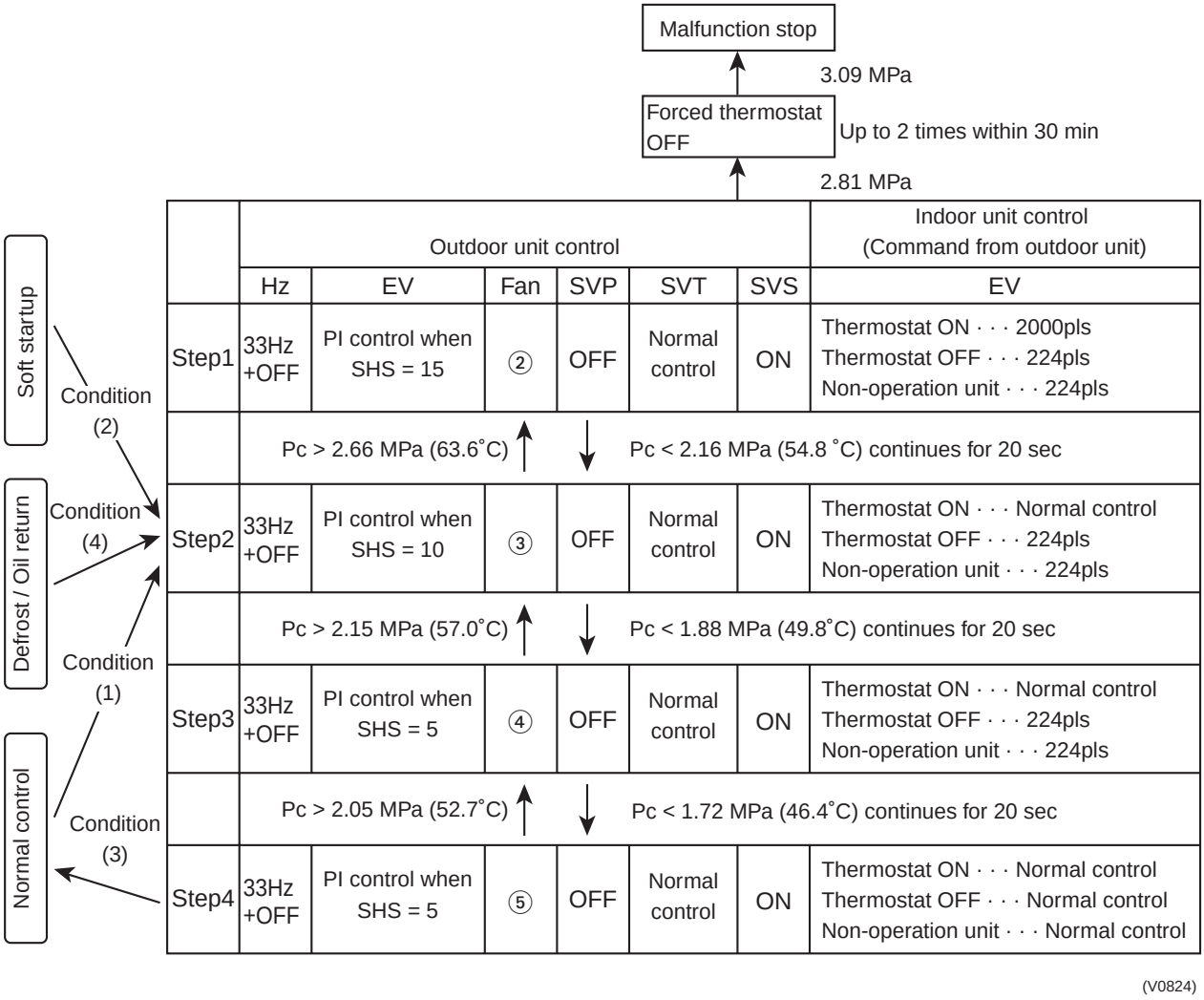
OR	&	Indoor unit thermostat ON capacity of 8.0 kW (3HP) or less		
		OR	Ta≥15°C	
			&	Ta < 15°C
				HP ≥ 2.26MPa
	HP≥2.37MPa			

Condition (3)

&	OR	HP < 1.70MPa Continues for 300 sec
		HP < 1.54MPa
	5 min elapsed after compressor startup	
	5 min elapsed after defrost completion	
	5 min elapsed after oil return completion	

Condition (4)

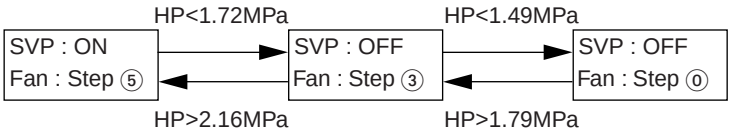
&	HP > 2.37MPa
	5 min elapsed after defrost completion
	5 min elapsed after oil return completion



(V0824)

[Oil return mode (common for cooling / heating)]

Outdoor unit fan and hot gas bypass solenoid valve (SVP) under oil return operation are controlled not to actuate high pressure protection. Also outdoor fan is controlled to protect short refrigerant circulation due to low high pressure during low ambient temperature. (Oil returning is hard at short refrigerant circulation)



(V0825)

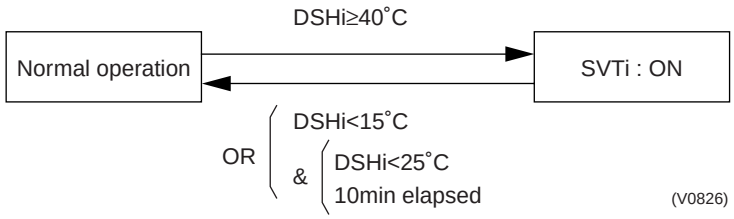
3.1.13 Discharge Pipe Temperature Control

Controls the liquid injection and operating frequency to prevent abnormal increase of discharge pipe temperature and compressor internal temperature.

Liquid Injection Control (Inverter Compressor)

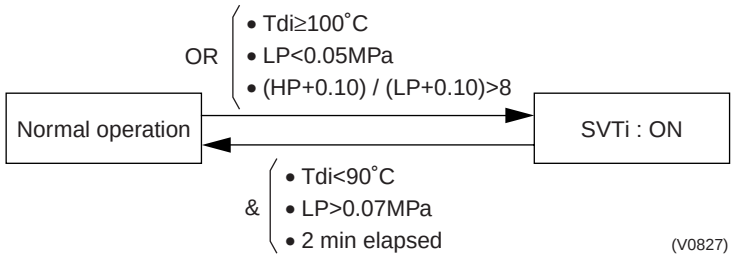
■ **Opens SVTi (Y3S) (solenoid valve for inverter compressor liquid injection) for 3 minutes after software startup.**

[Cooling]

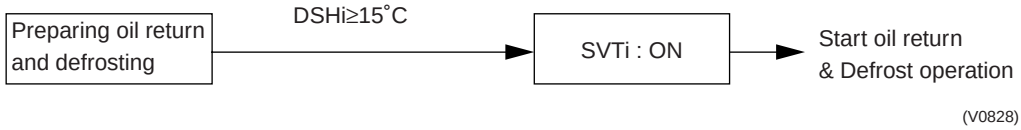


DSHi: Inverter compressor discharge pipe superheated degree
= Tdi (Th3-1) - (HP equivalent saturation temperature)
Tdi: Inverter compressor discharge pipe temperature (Th3-1)

[Heating]



[Preparing Oil return and defrosting operation (1 min before operation start)]

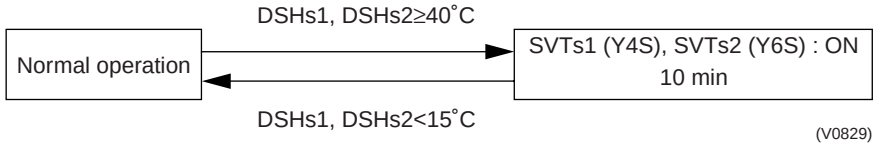


[Oil return operation/defrosting operation]

■ SVTi (Y3S) is OFF at any case when inverter compressor stops.

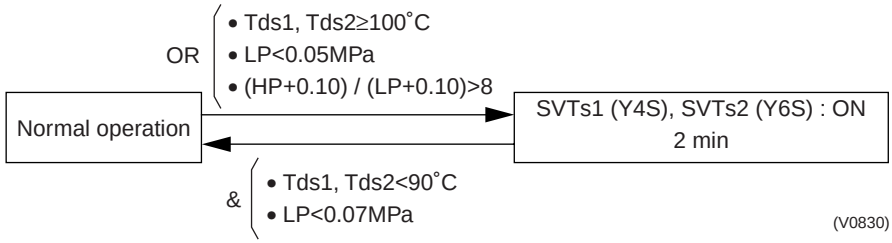
Liquid Injection Control (STD Compressor)

[In cooling operation]



DSHs: STD compressor discharge pipe superheated degree
= Tds1, 2 (Th3-2) - (HP equivalent saturation temperature)
Tds1, 2 : STD compressor discharge pipe temperature (Th3-2)

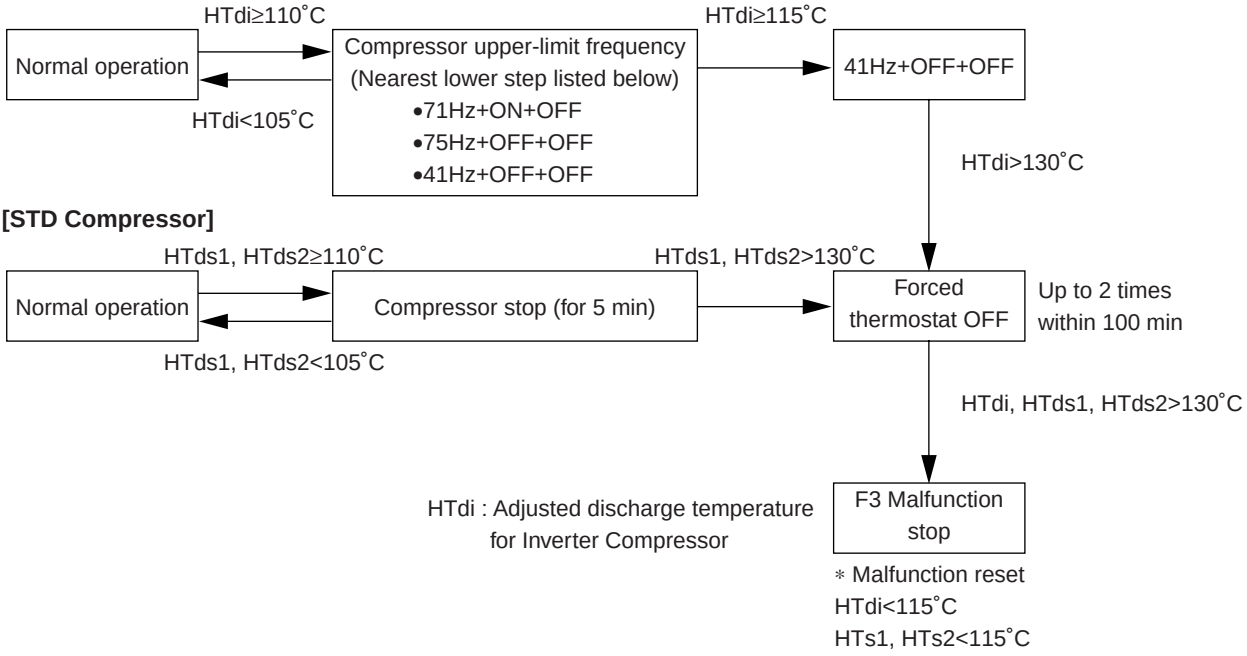
[In heating operation]



[Defrosting in oil return mode]
SVTs turns ON continuously
■ SVTs is OFF at any case when STD compressor stops.

Operating Frequency Control

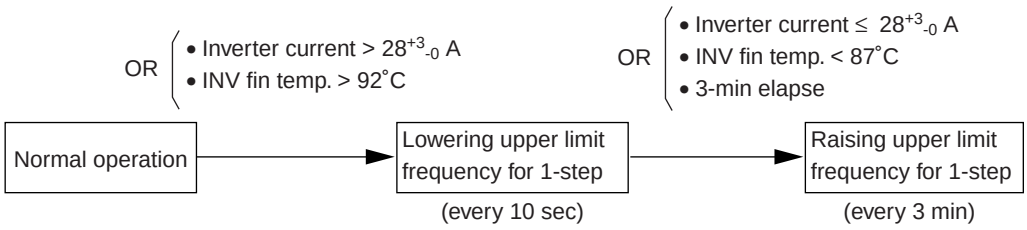
[INV Compressor]



(V0831)

3.1.14 Inverter Protection Control

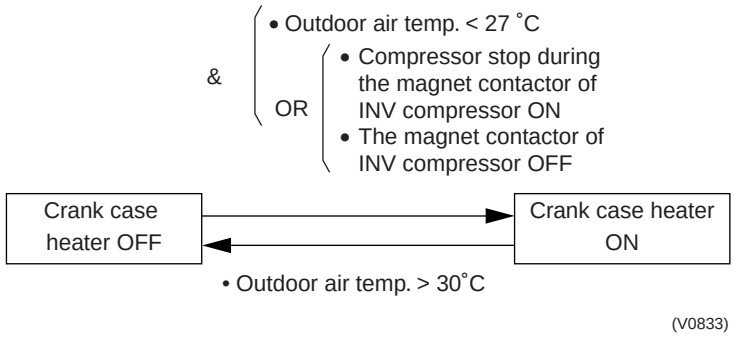
Controls the compressor upper-limit frequency to prevent tripping by inverter overcurrent and fin temperature increase.


OR
• Inverter current > 28$^{+3}_{-0}$ A
• INV fin temp. > 92˚C
OR
• Inverter current ≤ 28$^{+3}_{-0}$ A
• INV fin temp. < 87˚C
• 3-min elapse
Normal operation
Lowering upper limit frequency for 1-step
(every 10 sec)
Raising upper limit frequency for 1-step
(every 3 min)

(V0832)

3.1.15 Crankcase Heater Control

Controls the crankcase heater to prevent refrigerant from remaining in the inverter compressor.



Note: STD compressor crankcase heater is controlled previous way. (ON/OFF by magnetic switch)

3.1.16 Gas Shortage Warning

Generates a warning when an excessive gas shortage occurs. This function generates an alarm only, and does not stop operation.

• In cooling mode

· Lp < 0.10MPa (-21.6°C) 30 continuous minutes → Outputs gas shortage warning [U0].
· Lp ≥ 0.10MPa (-21.6°C) → Cancels gas shortage warning.

• In heating mode

&	SH1 (Evaporator1 outlet superheat degree) > 20°C	Left conditions remain for 60 continuous minutes → Outputs gas shortage warning [U0].
	EV1 = 2000 pls (full open)	
	SH2 (Evaporator2 outlet superheat degree) > 20°C	
	EV2 = 2000 pls (full open)	
	SH3 (Evaporator3 outlet superheat degree) > 20°C	
	EV3 = 2000 pls (full open)	
OR	SH1 (Evaporator1 outlet superheat degree) ≤ 20°C	→ Cancels gas shortage warning.
	EV1 < 2000 pls (full open)	
	SH2 (Evaporator2 outlet superheat degree) ≤ 20°C	
	EV2 < 2000 pls (full open)	
	SH3 (Evaporator3 outlet superheat degree) ≤ 20°C	
	EV3 < 2000 pls (full open)	

3.1.17 Heating Pump-Down Residual Operation

Conduct an operation during stop mode to discharge refrigerant from the low pressure side, since liquid refrigerant remaining in the accumulator can be sucked into the compressor during startup and dilutes the refrigerating machine oil in the compressor and lowers the lubricating performance.

[Residual operation starting condition]

&	Thermostat ON → OFF	
	OR	DSHi < 20°C
		Th6 – Te < 10°C

DSHi : INV discharge pipe superheat degree
Th6-Te : Suction pipe temp. -Low pressure equivalent saturation temp.

[Description of movement]

	Outdoor unit			Indoor unit
	Compressor	Motorized valve	Solenoid valve for hot gas	Motorized valve
Movement	67Hz+OFF	Initial 2000 pls → PI control when SHS = 10°C	ON (equalization)	500 pls (all indoor unit)

∗ Receiver gas relief solenoid valve is open and liquid refrigerant is moved to liquid line for 60 seconds after entering pump-down residual operation.
However, this relief solenoid valve closes at Th6-Te < 0.

[Ending condition]

&	DSHi > 90°C
	Th6 – Te < 10°C
	LP < 0.07MPa
	Tc > 48.6°C
	10 min elapse

3.1.18 Backup Operation

[Purpose]

The following backup operation is activated when the constant-speed compressor protection device operates.

< For 2-compressor system >

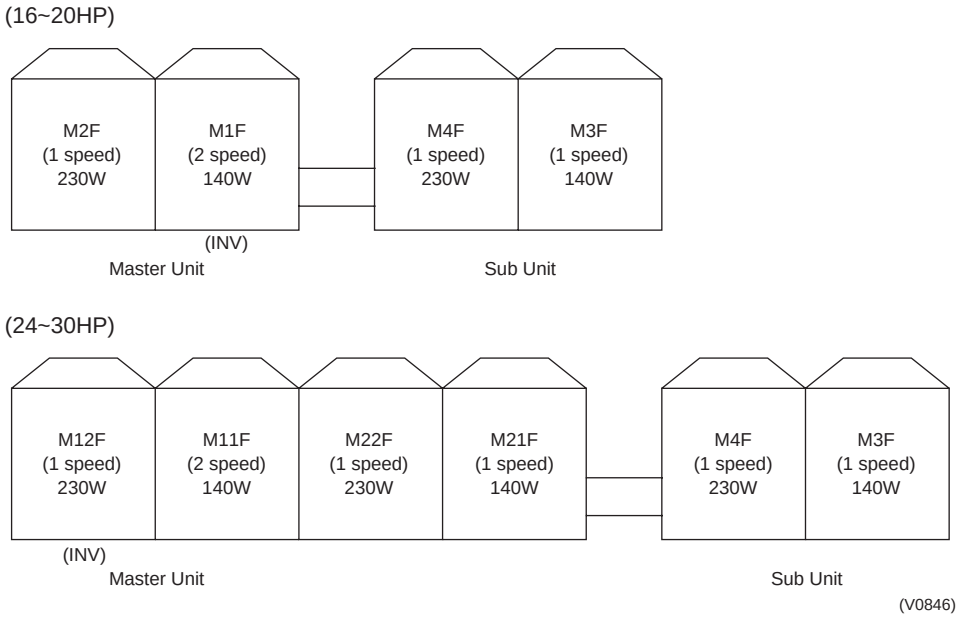
- When the STD compressor OC operates, the operation continues using only the inverter compressor based on all remote control reset. (for 3 hours only)

< For 3-compressor system >

- When the STD compressor OC operates, the operation continues using compressor except last started STD compressor based on remote control reset. (for 3 hours only)
- When OC operates again immediately after a backup operation (within 5 minutes after STD compressor startup), STD1 and STD2 are switched and operation is retried.
- If OC activates again, only the inverter compressor is used for the operation.
  (In any case, the backup operation ends after 3 hours.)
- The compressor in which OC is activated is prohibited to operate until power reset is conducted for a restart.

3.1.19 Fan Location and Fan Tap

Fan Location



Fan Tap Table

tap	16~20HP				24~30HP					
	M1F	M2F	M3F	M4F	M11F	M12F	M21F	M22F	M3F	M4F
◎	OFF	+OFF	/OFF	+OFF	OFF	+OFF	+OFF	+OFF	/OFF	+OFF
1	L	+OFF	/OFF	+OFF	L	+OFF	+OFF	+OFF	/OFF	+OFF
2	H	+OFF	/OFF	+OFF	H	+OFF	+OFF	+OFF	/OFF	+OFF
3	H	+OFF	+ON	+OFF	H	+OFF	+ON	+OFF	+ON	+OFF
4	H	+ON	+ON	+OFF	H	+ON	+ON	+OFF	+ON	+OFF
5	H	+ON	+ON	+ON	H	+ON	+ON	+ON	+ON	+ON

Tfin > 87°C ↓ ↑ Tfin < 67°C

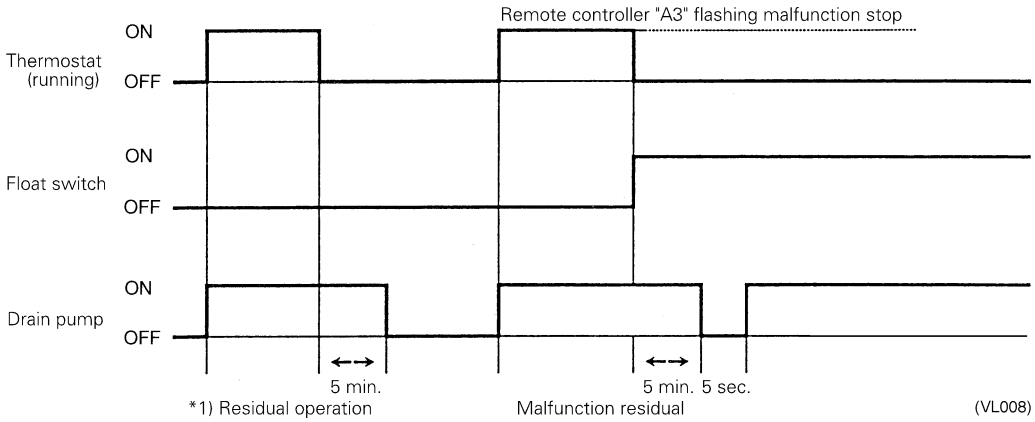
tap	24~30HP					
	M11F	M12F	M21F	M22F	M3F	M4F
◎’	OFF	+ON	+OFF	+OFF	/OFF	+OFF
1’	OFF	+ON	+OFF	+OFF	/OFF	+OFF
2’	OFF	+ON	+OFF	+OFF	/OFF	+OFF
3’	OFF	+ON	+ON	+OFF	+ON	+OFF
4’	H	+ON	+ON	+OFF	+ON	+OFF
5’	H	+ON	+ON	+ON	+ON	+ON

3.2 Indoor Unit

3.2.1 Drain Pump Control

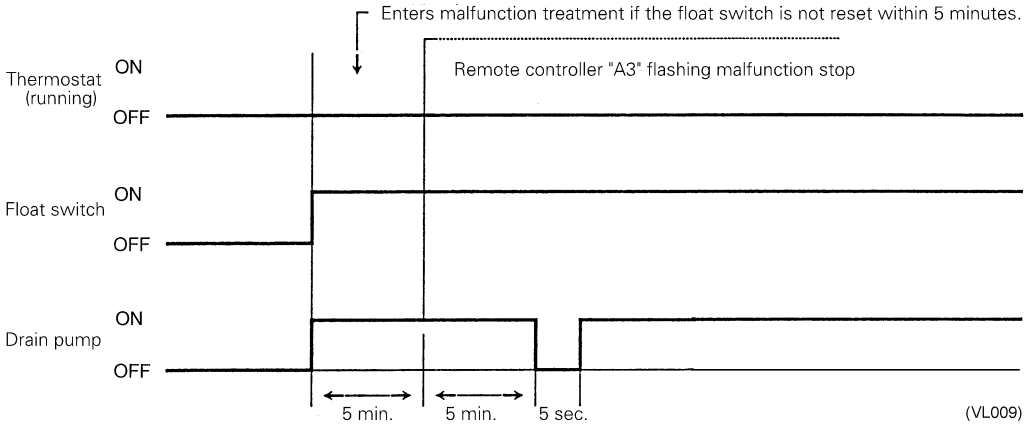
1. The drain pump is controlled by the ON/OFF buttons (4 button (1) - (4) given in the figure below).

When the Float Switch is Tripped While the Cooling Thermostat is ON:

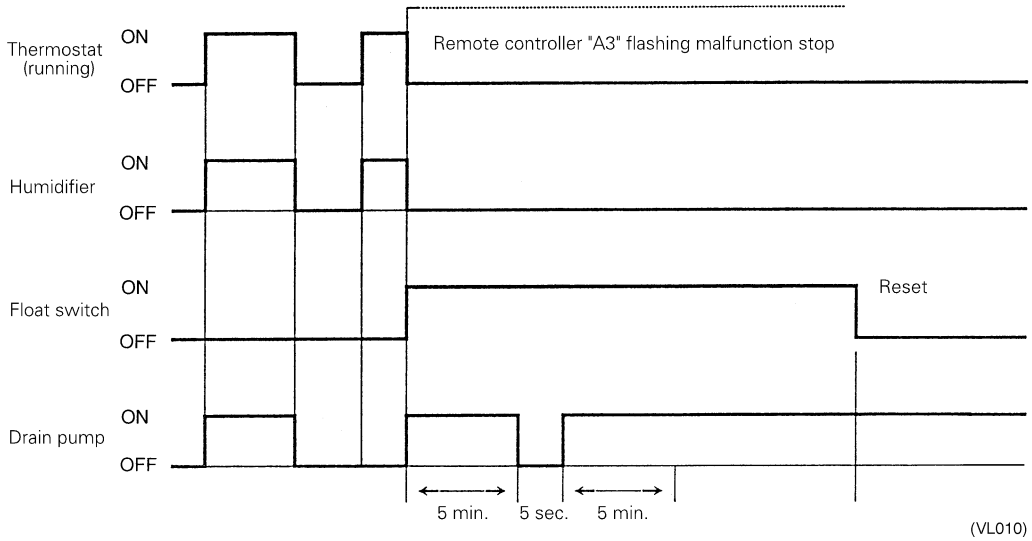


∗ 1. The objective of residual operation is to completely drain any moisture adhering to the fin of the indoor unit heat exchanger when the thermostat goes off during cooling operation.

When the Float Switch is Tripped During Cooling OFF by Thermostat:

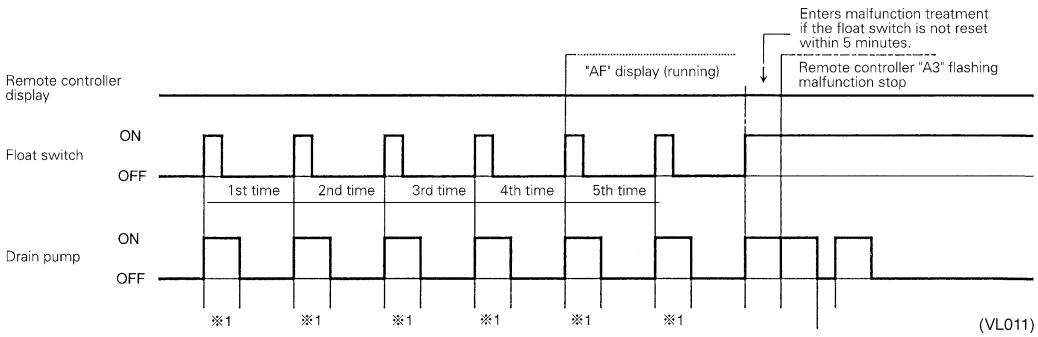


When the Float Switch is Tripped During Heating Operation:



During heating operation, if the float switch is not reset even after the 5 minutes operation, 5 seconds stop, 5 minutes operation cycle ends, operation continues until the switch is reset.

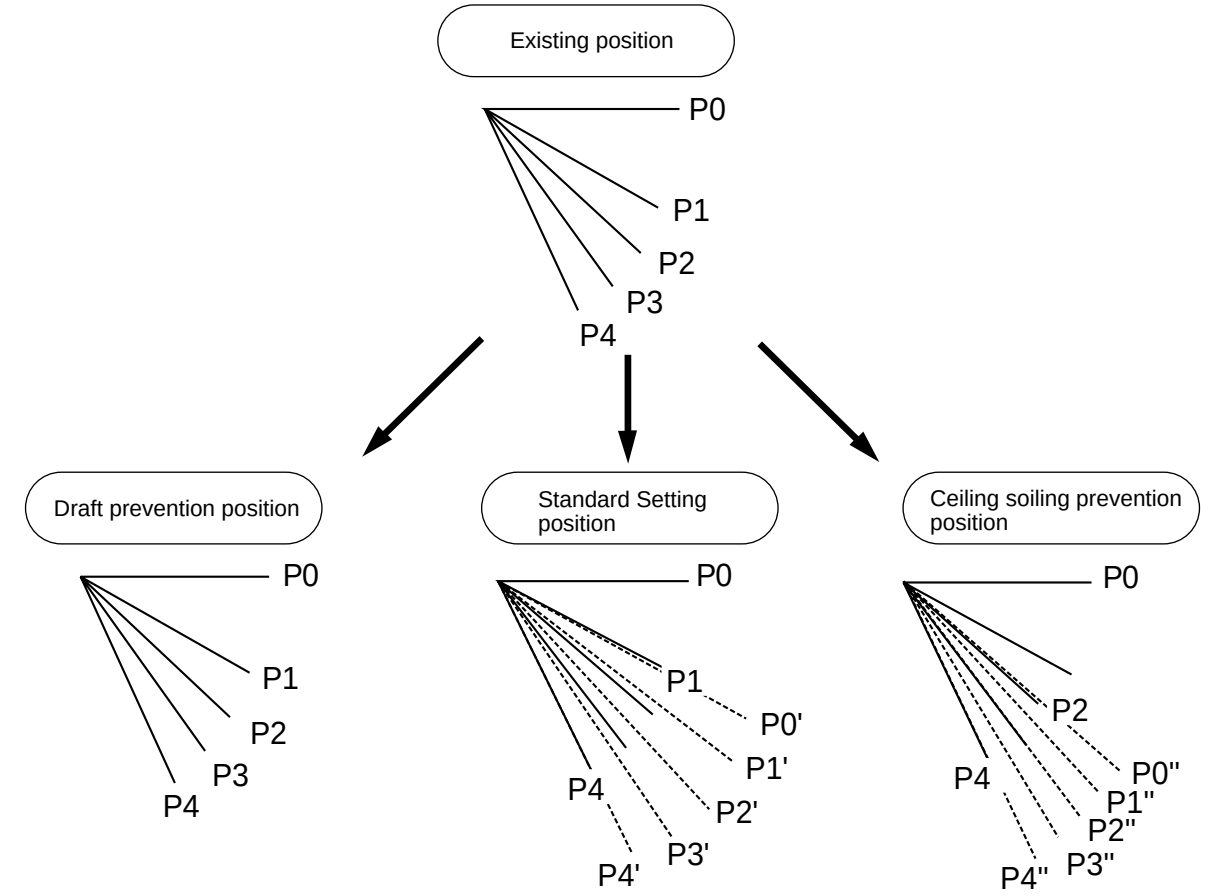
When the Float Switch is Tripped and “AF” is Displayed on the Remote Controller:



Note: If the float switch is tripped five times in succession, a drain malfunction is determined to have occurred. “AF” is then displayed as operation continues.

3.2.2 Louver Control for Preventing Ceiling Dirt

We have added a control feature that allows you to select the range of in which air direction can be adjusted in order to prevent the ceiling surrounding the air discharge outlet of ceiling mounted cassette type units from being soiled. (This feature is available on 2-way blow, 4-way blow and corner types.)



Draft prevention position	P0	P1	P2	P3	P4	Same as existing position
			Range of direction adjustment			
Standard position	Prohibited	P0'	P1'	P2'	P3'	P4'	Separated into 5 positions (P1 - 4)
			Range of direction adjustment			
Dirt prevention position	Prohibited		P0"	P1"	P2"	P3"	P4"	Separated into 5 positions (P2 - 4)

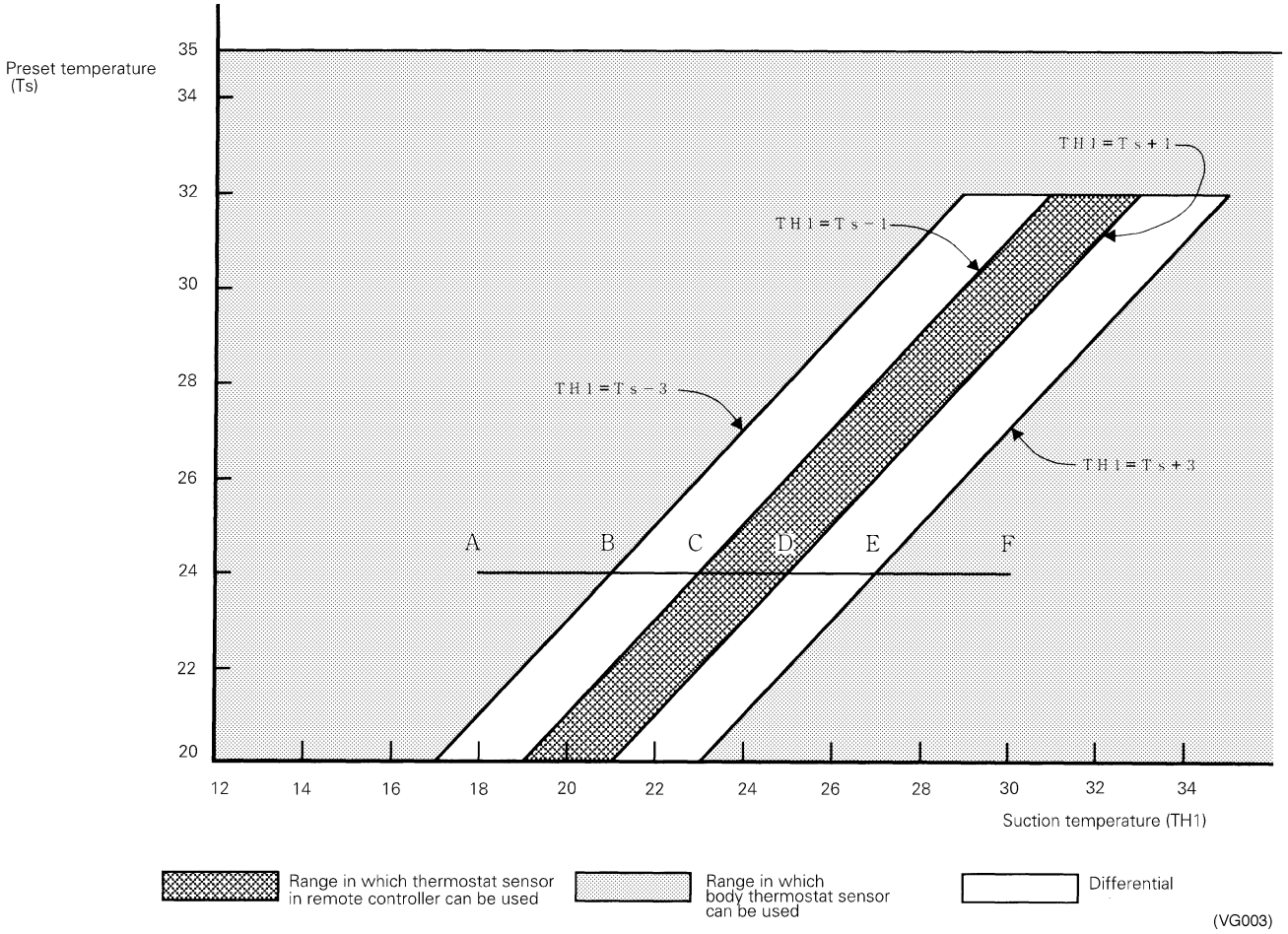
The factory set position is standard position. (VL012)

3.2.3 Thermostat Sensor in Remote Controller

Temperature is controlled by both the thermostat sensor in remote controller and air suction thermostat in the indoor unit. (This is however limited to when the field setting for the thermostat sensor in remote controller is set to “Use”.)

Cooling

If there is a significant difference in the preset temperature and the suction temperature, fine adjustment control is carried out using a body thermostat sensor, or using the sensor in the remote controller near the position of the user when the suction temperature is near the preset temperature.



■ **Ex: When cooling**

Assuming the preset temperature in the figure above is 24°C, and the suction temperature has changed from 18°C to 30°C (A → F):

(This example also assumes there are several other air conditioners, the UM series is off, and that temperature changes even when the thermostat sensor is off.)

Body thermostat sensor is used for temperatures from 18°C to 23°C (A → C).

Remote controller thermostat sensor is used for temperatures from 23°C to 27°C (C → E).

Body thermostat sensor is used for temperatures from 27°C to 30°C (E → F).

And, assuming suction temperature has changed from 30°C to 18°C (F → A):

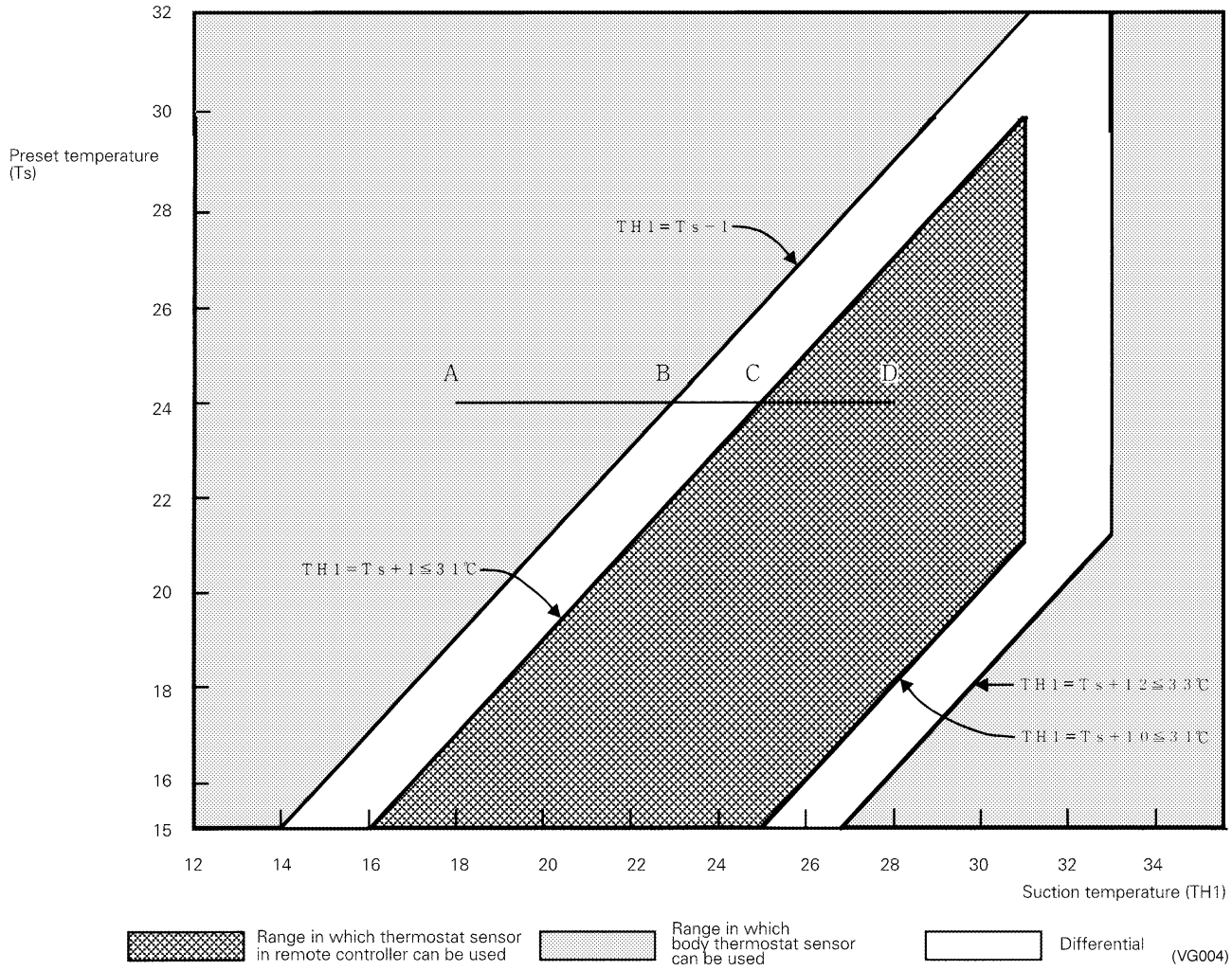
Body thermostat sensor is used for temperatures from 30°C to 25°C (F → D).

Remote controller thermostat sensor is used for temperatures from 25°C to 21°C (D → B).

Body thermostat sensor is used for temperatures from 21°C to 18°C (B → A).

Heating

When heating, the hot air rises to the top of the room, resulting in the temperature being lower near the floor where the occupants are. When controlling by body thermostat sensor only, the unit may therefore be turned off by the thermostat before the lower part of the room reaches the preset temperature. The temperature can be controlled so the lower part of the room where the occupants are doesn't become cold by widening the range in which thermostat sensor in remote controller can be used so that suction temperature is higher than the preset temperature.



■ **Ex: When heating**

Assuming the preset temperature in the figure above is 24°C, and the suction temperature has changed from 18°C to 28°C (A → F):

(This example also assumes there are several other air conditioners, the UM series is off, and that temperature changes even when the thermostat sensor is off.)

Body thermostat sensor is used for temperatures from 18°C to 25°C (A → C).

Remote controller thermostat sensor is used for temperatures from 25°C to 28°C (C → E).

And, assuming suction temperature has changed from 28°C to 18°C (D → A):

Remote controller thermostat sensor is used for temperatures from 28°C to 23°C (D → B).

Body thermostat sensor is used for temperatures from 23°C to 18°C (B → A).

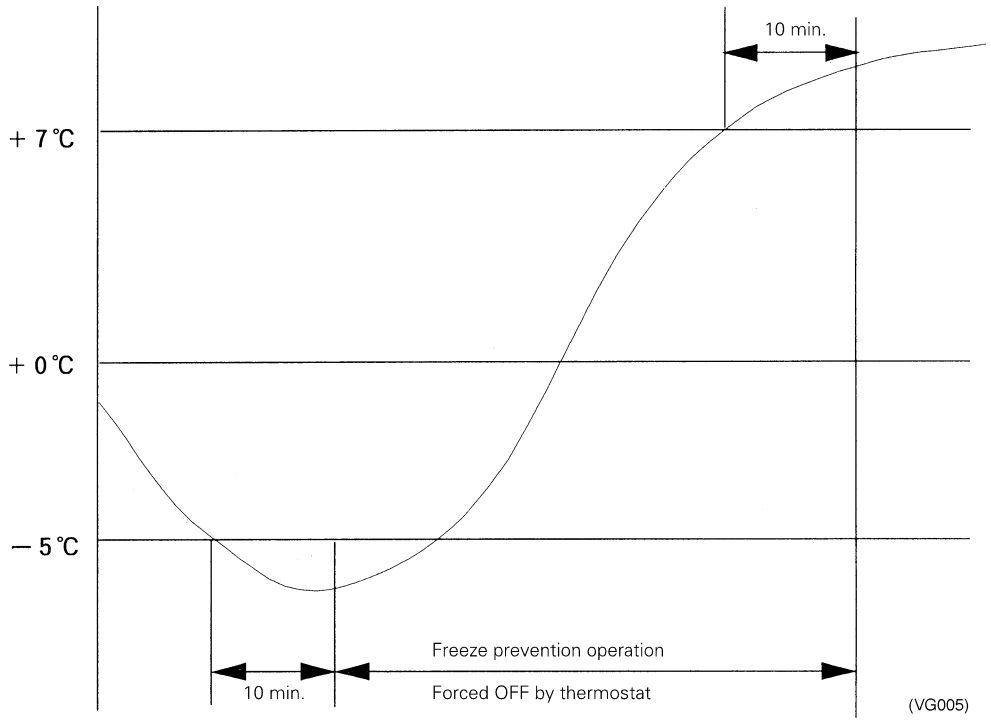
3.2.4 Freeze Prevention

Freeze Prevention by Off Cycle (Indoor Unit)

When the temperature detected by liquid pipe temperature thermistor (R2T) of the indoor unit heat exchanger drops too low, the unit enters freeze prevention operation in accordance with the following conditions, and is also set in accordance with the conditions given below.

Conditions for starting freeze prevention: Temperature is -1°C or less for total of 40 min., or temperature is -5°C or less for total of 10 min.
Conditions for stopping freeze prevention: Temperature is +7°C or more for 10 min. continuously

Ex: Case where temperature is -5°C or less for total of 10 min.



Part 3
Test Operation

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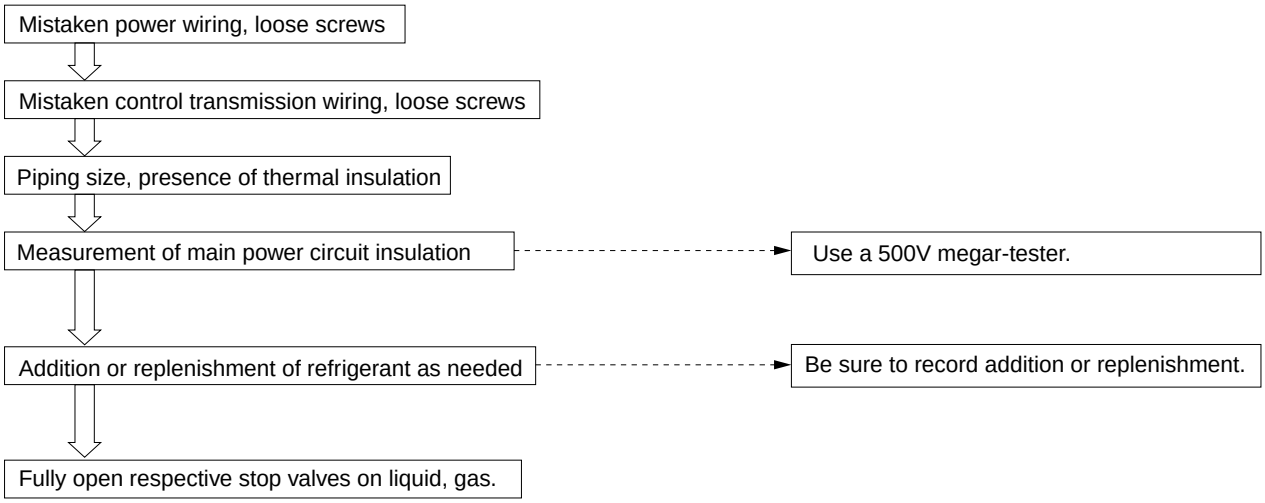
1. Test Operation

1.1 Procedure and Outline

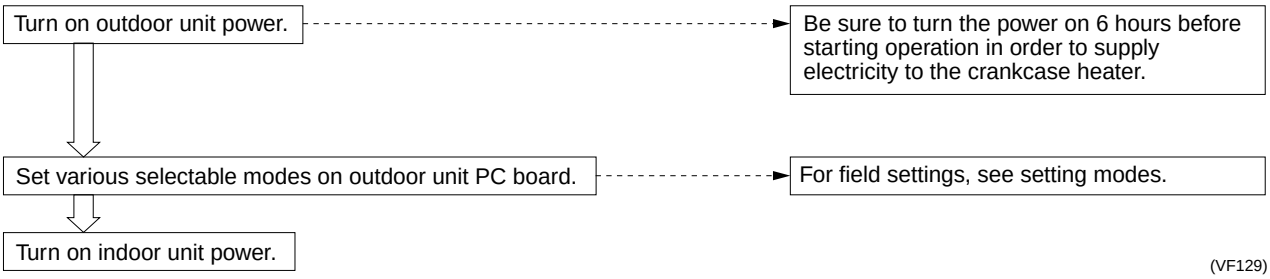
The operation sequence is the most important thing for test operation. Follow the following outline.

1.1.1 Check The Following Before Turning Power On.


Mistaken power wiring, loose screws
Mistaken control transmission wiring, loose screws
Piping size, presence of thermal insulation
Measurement of main power circuit insulation
Use a 500V megar-tester.
Addition or replenishment of refrigerant as needed
Be sure to record addition or replenishment.
Fully open respective stop valves on liquid, gas.

(VF128)

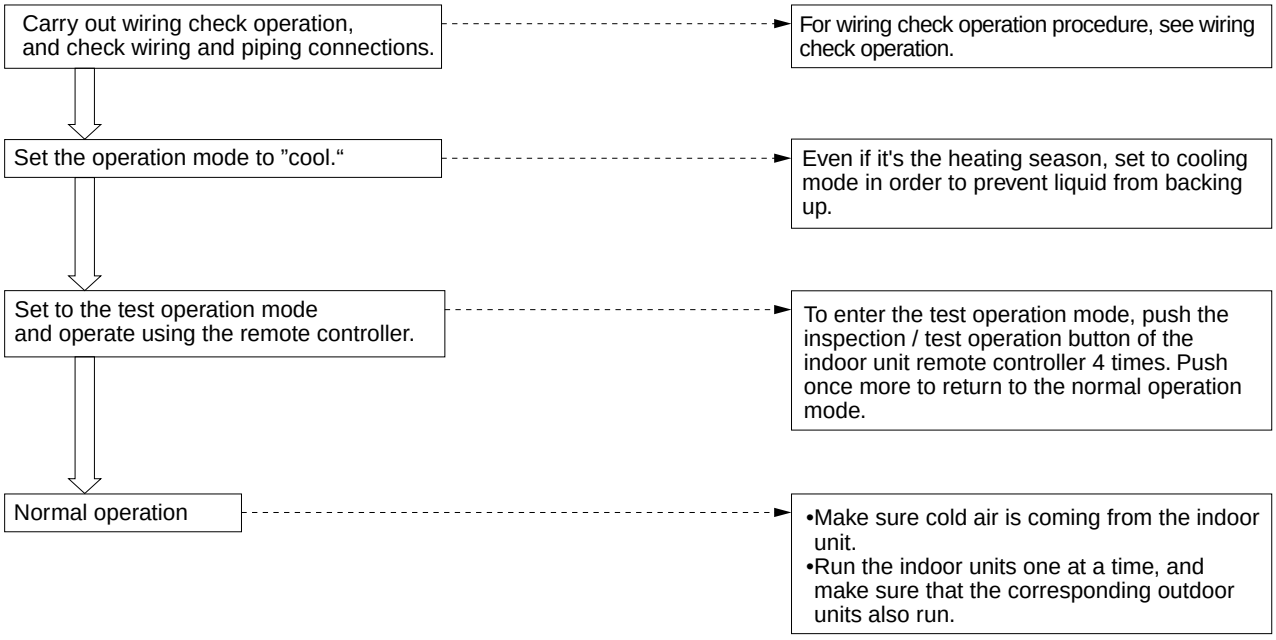
1.1.2 Turn Power On.


Turn on outdoor unit power.
Be sure to turn the power on 6 hours before starting operation in order to supply electricity to the crankcase heater.
Set various selectable modes on outdoor unit PC board.
For field settings, see setting modes.
Turn on indoor unit power.

(VF129)

Note: Refer to Setting Modes on P457

1.1.3 Check Operation.


Carry out wiring check operation, and check wiring and piping connections.
For wiring check operation procedure, see wiring check operation.
Set the operation mode to ”cool.“
Even if it's the heating season, set to cooling mode in order to prevent liquid from backing up.
Set to the test operation mode and operate using the remote controller.
To enter the test operation mode, push the inspection / test operation button of the indoor unit remote controller 4 times. Push once more to return to the normal operation mode.
Normal operation
•Make sure cold air is coming from the indoor unit.
•Run the indoor units one at a time, and make sure that the corresponding outdoor units also run.

(VF130)

Note: Refer to Wiring Check Operation on P472

Caution
When the 400 volt power supply is applyed to "N" phase by mistake, replace Inverter P.C.B (A2P) and control transformer (T1R, T2R) in switch box together.

(V0847)

1.2 Operation When Power is Turned On

1.2.1 When Turning On Power for First Time

The unit cannot be run for up to 12 minutes to automatically set the master power and address (indoor-outdoor address, etc.).

- Outdoor unit ... Warning lamp (H2P) lights
  Test lamp (H2P) blinks
  Can also be set during operation described above.
- Indoor unit ... If ON button is pushed during operation described above, the “UH” malfunction indicator blinks. (Returns to normal when automatic setting is complete.)

1.2.2 When Turning On Power The Second Time and Subsequent

Tap the RESET button (BS5) on the outdoor unit PC board. Operation becomes possible after setting up for about 2 minutes. If you do not push the RESET button, the unit cannot be run for up to 10 minutes to automatically set master power.

- Outdoor unit ... Warning lamp (H2P) lights
  Test lamp (H2P) blinks
  Can also be set during operation described above.
- Indoor unit ... If ON button is pushed during operation described above, the operation lamp lights but the compressor does not operate. (Returns to normal when automatic setting is complete.)

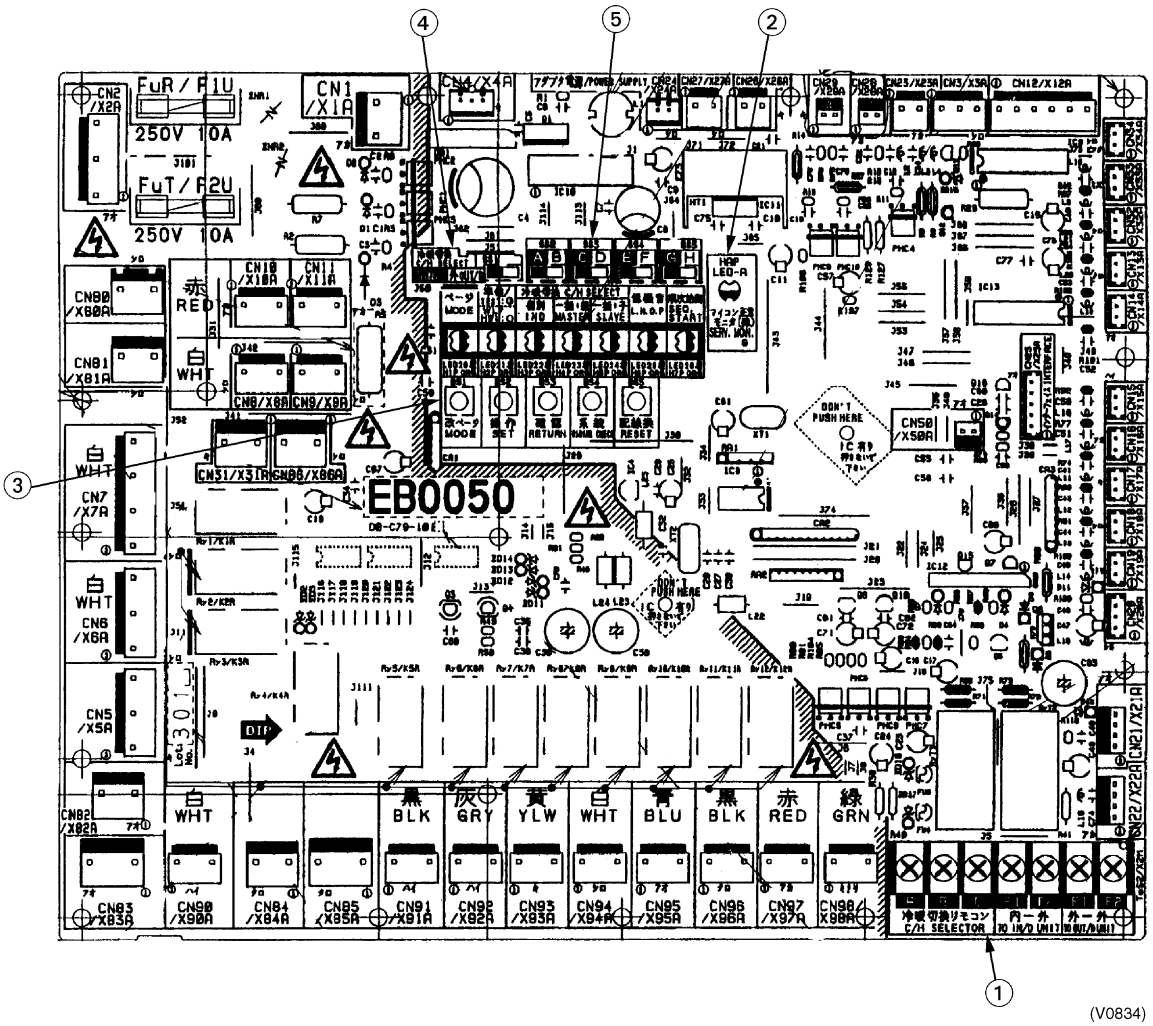
1.2.3 When an Outdoor Unit or Indoor Unit Has Been Added, or Indoor / Outdoor Units PC Board Has Been Changed

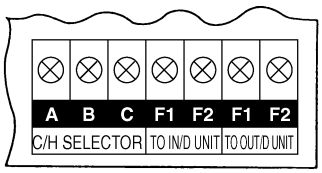
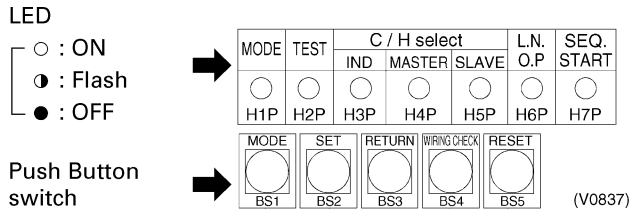
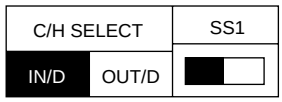
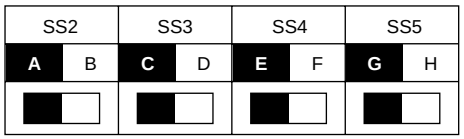
Be sure to push and hold the wiring change button for 5 seconds or longer. If not, the addition cannot be recognized. In this case, the unit cannot be run for up to 12 minutes to automatically set the address (indoor-outdoor address, etc.).

- Outdoor unit ... Warning lamp (H2P) lights
  Test lamp (H2P) goes off
  Can also be set during operation described above.
- Indoor unit ... If ON button is pushed during operation described above, the “UH” or “U4” malfunction indicator blinks. (Returns to normal when automatic setting is complete.)

1.3 Outdoor Unit PC Board Ass'y

Outdoor Unit



1	Transmission terminal Indoor unit, Cool/Heat selector Outdoor - Outdoor	 (V0835)
2	Service monitor LED (Green)	(V0836)
3	Function setting mode switch and LED	LED  (V0837)
4	Function of setting between cooling and heating	 (V0838)
5	Outdoor unit Capacity setting switch	Switches for capacity setting when the outdoor unit PC board is replaced to spare parts PC board.  (V0848) Refer table below.

	SS2		SS3		SS4		SS5	
	A	B	C	D	E	F	G	H
PA-16MA1XPK		■		■	■			■
PA-18MA1XPK		■	■			■		■
PA-20MA1XPK		■	■			■		■
PA-24MA1XPK		■	■		■		■	
PA-26MA1XPK		■	■		■		■	
PA-28MA1XPK	■			■		■	■	
PA-30MA1XPK	■			■		■	■	

Capacity setting table

Note: Resetting of power supply switch is necessary after capacity setting.

1.4 Setting Modes

There are the following three setting modes.

◆ **Setting mode 1 (H1P off)**

Used to select the cool/heat setting, low-noise run and sequential start.

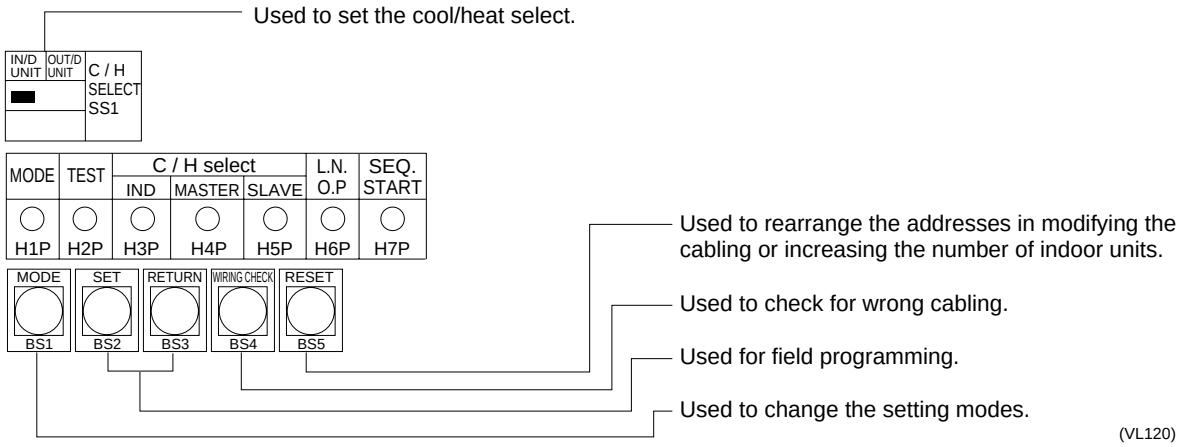
◆ **Setting mode 2 (H1P on)**

Used to modify the running status and to program addresses, etc. Usually used in servicing the system.

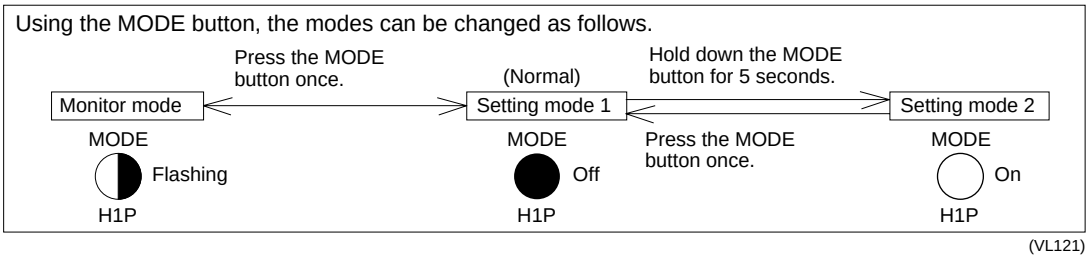
◆ **Monitor mode (H1P flashing)**

Used to check the programs made in the setting mode 2, the number of units being connected, and other entries.

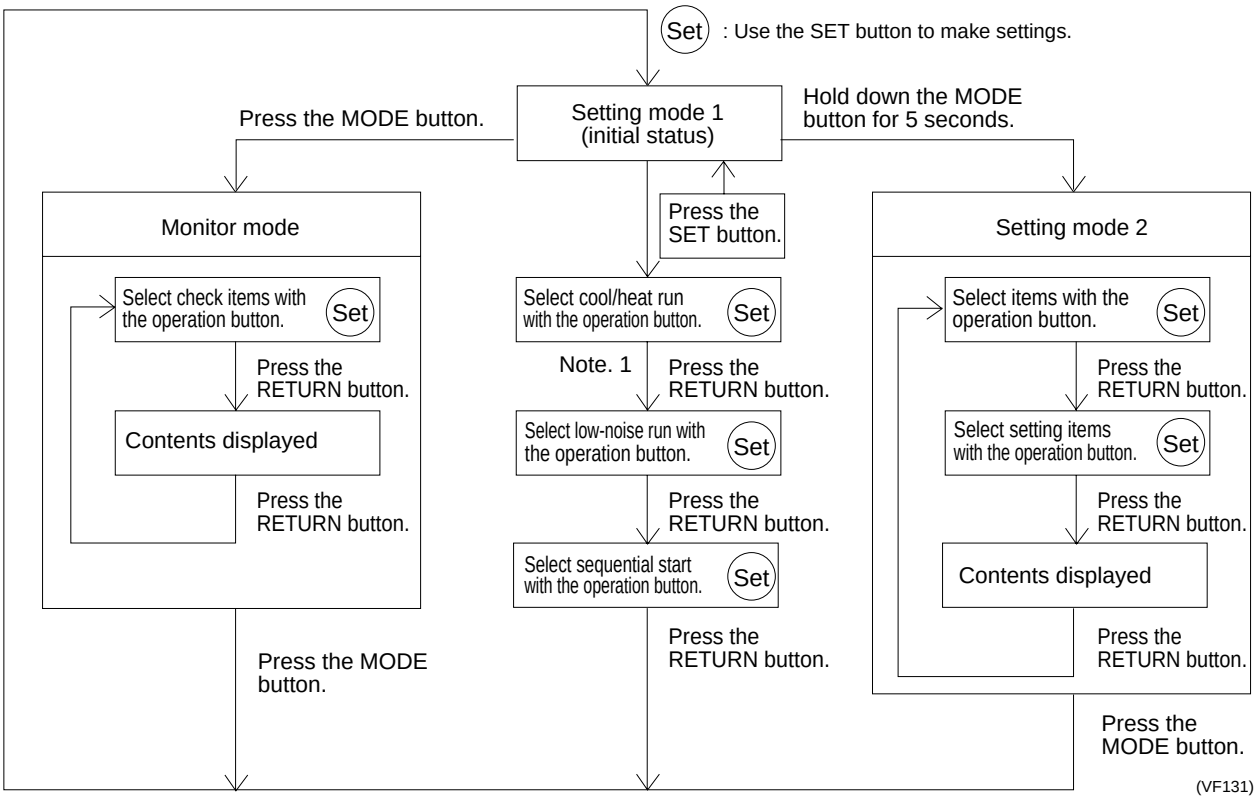
Functions of Pushbutton Switches



Mode Change

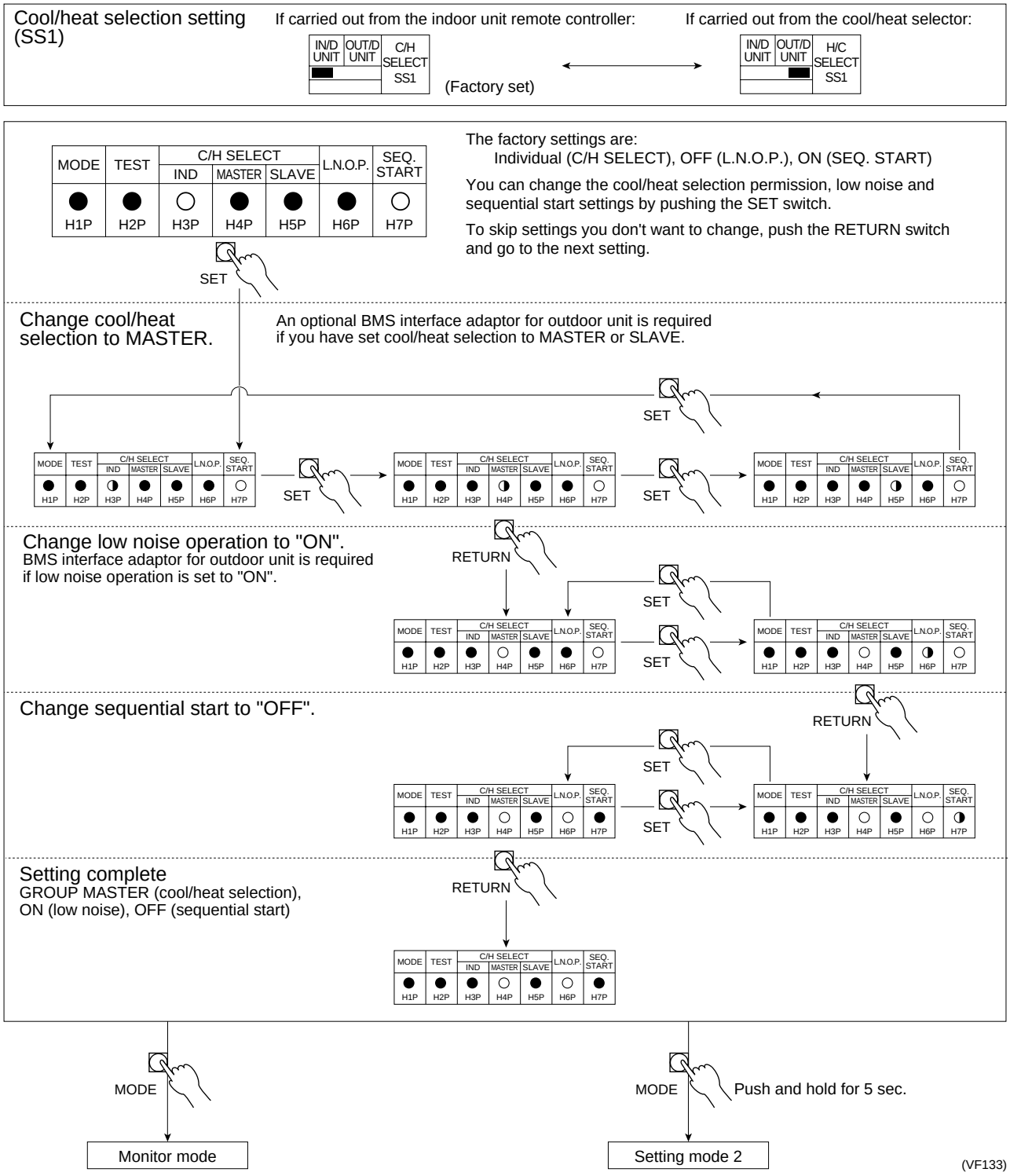


Mode Changing Procedure



Note: 1. If you become unsure of how to proceed, push the MODE button (BS1) and return to setting mode 1.
2. Power reset is not necessary after setting of setting mode 1 (including C/H select SS1) and setting mode 2.

1.4.1 Setting Mode 1


Cool/heat selection setting (SS1)
If carried out from the indoor unit remote controller:
IN/D UNIT
OUT/D UNIT
C/H SELECT SS1
(Factory set)
If carried out from the cool/heat selector:
IN/D UNIT
OUT/D UNIT
H/C SELECT SS1
MODE
TEST
C/H SELECT
IND
MASTER
SLAVE
L.N.O.P.
SEQ. START
H1P
H2P
H3P
H4P
H5P
H6P
H7P
The factory settings are:
Individual (C/H SELECT), OFF (L.N.O.P.), ON (SEQ. START)
You can change the cool/heat selection permission, low noise and sequential start settings by pushing the SET switch.
To skip settings you don't want to change, push the RETURN switch and go to the next setting.
SET
Change cool/heat selection to MASTER.
An optional BMS interface adaptor for outdoor unit is required if you have set cool/heat selection to MASTER or SLAVE.
RETURN
Change low noise operation to "ON".
BMS interface adaptor for outdoor unit is required if low noise operation is set to "ON".
Change sequential start to "OFF".
Setting complete
GROUP MASTER (cool/heat selection), ON (low noise), OFF (sequential start)
MODE
Monitor mode
Push and hold for 5 sec.
Setting mode 2
(VF133)

Note: BMS interface adaptor for outdoor unit is required if cool/heat selection set to MASTER or SLAVE, or if low noise operation is set to ON.

1.4.2 Setting Mode 2

To switch from setting mode 1 (normal) to setting mode 2, you must push and hold the next page button (BS1) for 5 seconds. (You cannot enter setting mode 2 while setting mode 1 is set.)

Setting Procedure

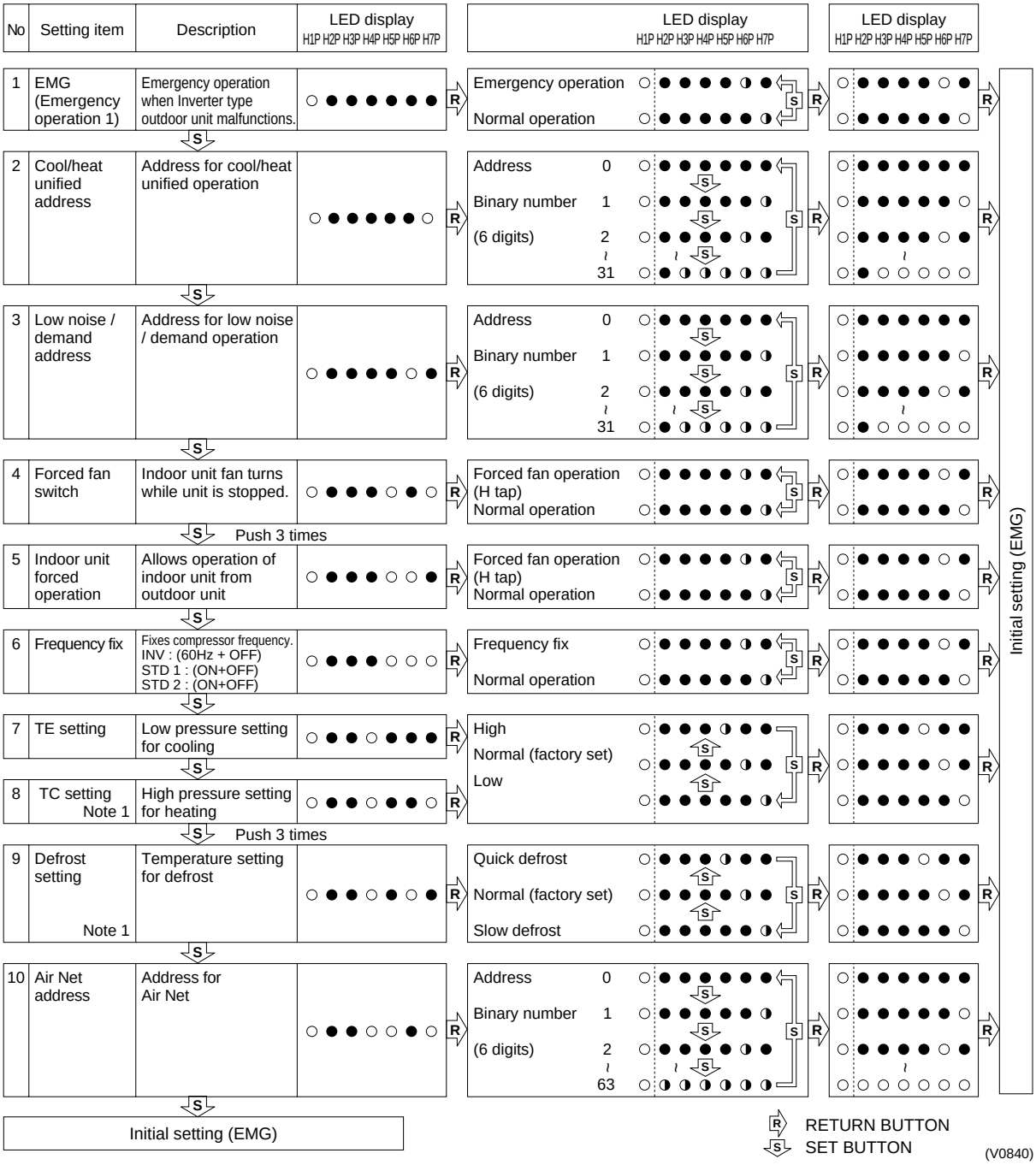
1. Push the SET button and match with the setting item (LED display). (All 10 settings)
   ↓
2. Push the RETURN button (BS3) and the present settings flicker (LED display).
   ↓
3. Push the SET button (BS2) and match with each setting (LED flicker display).
   ↓
4. Push the RETURN button (BS3) and enter the settings.
   ↓
5. Push the RETURN button (BS3) and return to the initial status.

Note:
1. If you become unsure of how to proceed, push the MODE button (BS1) and return to setting mode 1.
2. The initial status of setting mode 2 is the status of setting item No. 1 in mode 2.

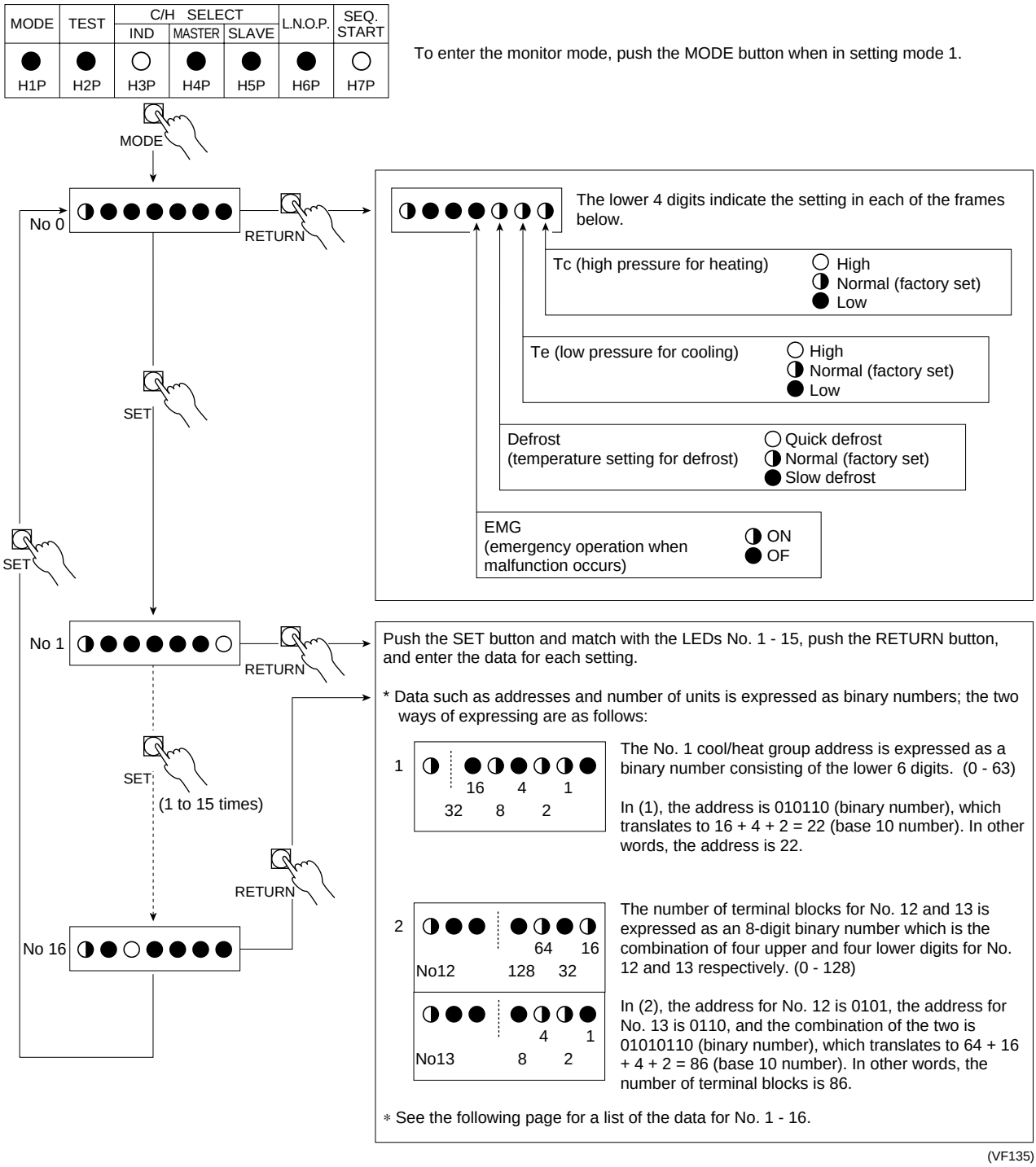
Setting Items

	Setting item	Description	LED display H1P H2P H3P H4P H5P H6P H7P		LED display H1P H2P H3P H4P H5P H6P H7P
1	EMG (Emergency operation 1)	Emergency operation when inverter type outdoor unit malfunctions.	○ ● ● ● ● ● ●	Emergency operation (Operates by constant speed outdoor unit only.) Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
2	Cool/heat unified address	Address for cool/heat unified operation	○ ● ● ● ● ● ○	Address 0 Binary number 1 (5 digits) 2 ↓ 31	○ ● ● ● ● ● ● ○ ● ● ● ● ● ○ ○ ● ● ● ● ○ ● ○ ● ○ ○ ○ ○ ○
3	Low noise / demand address	Address for low noise / demand operation.	○ ● ● ● ● ○ ●	Address 0 Binary number 1 (5 digits) 2 ↓ 31	○ ● ● ● ● ● ● ○ ● ● ● ● ● ○ ○ ● ● ● ● ○ ● ○ ● ○ ○ ○ ○ ○
4	Forced fan switch	Indoor unit fan turns while unit is stopped.	○ ● ● ● ○ ● ○	Forced fan operation (H tap) Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
5	Indoor unit forced operation	Allows operation of indoor unit from outdoor unit.	○ ● ● ● ○ ○ ●	Indoor unit forced operation Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
6	Frequency fix	Fixes compressor frequency. INV : (60Hz+OFF) STD1: (ON+OFF) STD2: (ON+OFF)	○ ● ● ● ○ ○ ○	Frequency fix Normal operation	○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
7	TE setting	Low pressure setting for cooling.	○ ● ● ○ ● ● ●	High Normal (factory set) Low	○ ● ● ● ○ ● ● ○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
8	TC setting Note 1	High pressure setting for heating	○ ● ● ○ ● ● ○		
9	Defrost setting Note 1	Temperature setting for defrost.	○ ● ● ○ ● ○ ●	Quick defrost Normal (factory set) Slow defrost	○ ● ● ● ○ ● ● ○ ● ● ● ● ○ ● ○ ● ● ● ● ● ○
10	Air NET address	Address for Air NET	○ ● ● ○ ○ ● ○	Address 0 Binary number 1 (6 digits) 2 ↓ 63	○ ● ● ● ● ● ● ○ ● ● ● ● ● ○ ○ ● ● ● ● ○ ● ○ ○ ○ ○ ○ ○ ○

(V0839)


No
Setting item
Description
LED display
H1P H2P H3P H4P H5P H6P H7P
1
EMG (Emergency operation 1)
Emergency operation when Inverter type outdoor unit malfunctions.
Emergency operation
Normal operation
2
Cool/heat unified address
Address for cool/heat unified operation
Address
Binary number
(6 digits)
0
1
2
31
3
Low noise / demand address
Address for low noise / demand operation
4
Forced fan switch
Indoor unit fan turns while unit is stopped.
Forced fan operation (H tap)
Normal operation
Push 3 times
5
Indoor unit forced operation
Allows operation of indoor unit from outdoor unit
6
Frequency fix
Fixes compressor frequency.
INV : (60Hz + OFF)
STD 1 : (ON+OFF)
STD 2 : (ON+OFF)
Frequency fix
7
TE setting
Low pressure setting for cooling
High
Normal (factory set)
Low
8
TC setting
Note 1
High pressure setting for heating
Push 3 times
9
Defrost setting
Note 1
Temperature setting for defrost
Quick defrost
Slow defrost
10
Air Net address
Address for Air Net
63
Initial setting (EMG)
R RETURN BUTTON
S SET BUTTON
(V0840)

1.4.3 Monitor Mode


MODE
TEST
C/H SELECT
IND
MASTER
SLAVE
L.N.O.P.
SEQ. START
H1P
H2P
H3P
H4P
H5P
H6P
H7P
To enter the monitor mode, push the MODE button when in setting mode 1.
MODE
No 0
RETURN
The lower 4 digits indicate the setting in each of the frames below.
Tc (high pressure for heating)
High
Normal (factory set)
Low
Te (low pressure for cooling)
High
Normal (factory set)
Low
Defrost
(temperature setting for defrost)
Quick defrost
Normal (factory set)
Slow defrost
EMG
(emergency operation when malfunction occurs)
ON
OF
SET
SET
No 1
RETURN
Push the SET button and match with the LEDs No. 1 - 15, push the RETURN button, and enter the data for each setting.
* Data such as addresses and number of units is expressed as binary numbers; the two ways of expressing are as follows:
1
16 4 1
32 8 2
The No. 1 cool/heat group address is expressed as a binary number consisting of the lower 6 digits. (0 - 63)
In (1), the address is 010110 (binary number), which translates to 16 + 4 + 2 = 22 (base 10 number). In other words, the address is 22.
SET
(1 to 15 times)
RETURN
No 16
2
64 16
No12 128 32
4 1
No13 8 2
The number of terminal blocks for No. 12 and 13 is expressed as an 8-digit binary number which is the combination of four upper and four lower digits for No. 12 and 13 respectively. (0 - 128)
In (2), the address for No. 12 is 0101, the address for No. 13 is 0110, and the combination of the two is 01010110 (binary number), which translates to 64 + 16 + 4 + 2 = 86 (base 10 number). In other words, the number of terminal blocks is 86.
* See the following page for a list of the data for No. 1 - 16.

(VF135)

■ **After making sure the data is correct, push the RETURN button and return to No. 0, or push the MODE button and return to setting mode 1.**

Monitor Mode Data

Mode No.	LED	Data	Display method	Size (binary number)
No 1	○●●●●○	Cool/heat group address	0 ~ 31	Lower 6 digits
No 2	○●●●●○●	Low noise / demand address	0 ~ 31	Lower 6 digits
No 3	○●●●●○○	Not used		
No 4	○●●●○●●	Not used	0 ~ 63	Lower 6 digits
No 5	○●●●○●○	Number of connected units	0 ~ 63 units	Lower 6 digits
No 6	○●●●○○●	Number of connected HR boxes	0 ~ 63 units	Lower 6 digits
No 7	○●●●○○○	Number of connected zone units (excluding outdoor and HR boxes)	0 ~ 63 units	Lower 6 digits
No 8	○●●○●●●	Number of outdoor units	0 ~ 63 units	Lower 6 digits
No 9	○●●○●●○	Number of HR boxes	0 ~ 128 units	Lower 4 digits, upper
No 10	○●●○●○●	Number of HR boxes	0 ~ 128 units	Lower 4 digits, lower
No 11	○●●○●○○	Number of zone units (excluding outdoor and HR boxes)	0 ~ 63 units	Lower 6 digits
No 12	○●●○○●●	Number of terminal blocks	0 ~ 128 units	Lower 4 digits, upper
No 13	○●●○○●○	Number of terminal blocks	0 ~ 128 units	Lower 4 digits, lower
No 14	○●●○○○●	Not used		
No 15	○●●○○○○	Not used		
No 16	○●○●●●●	Not used		

1.5 Cool / Heat Mode Selection

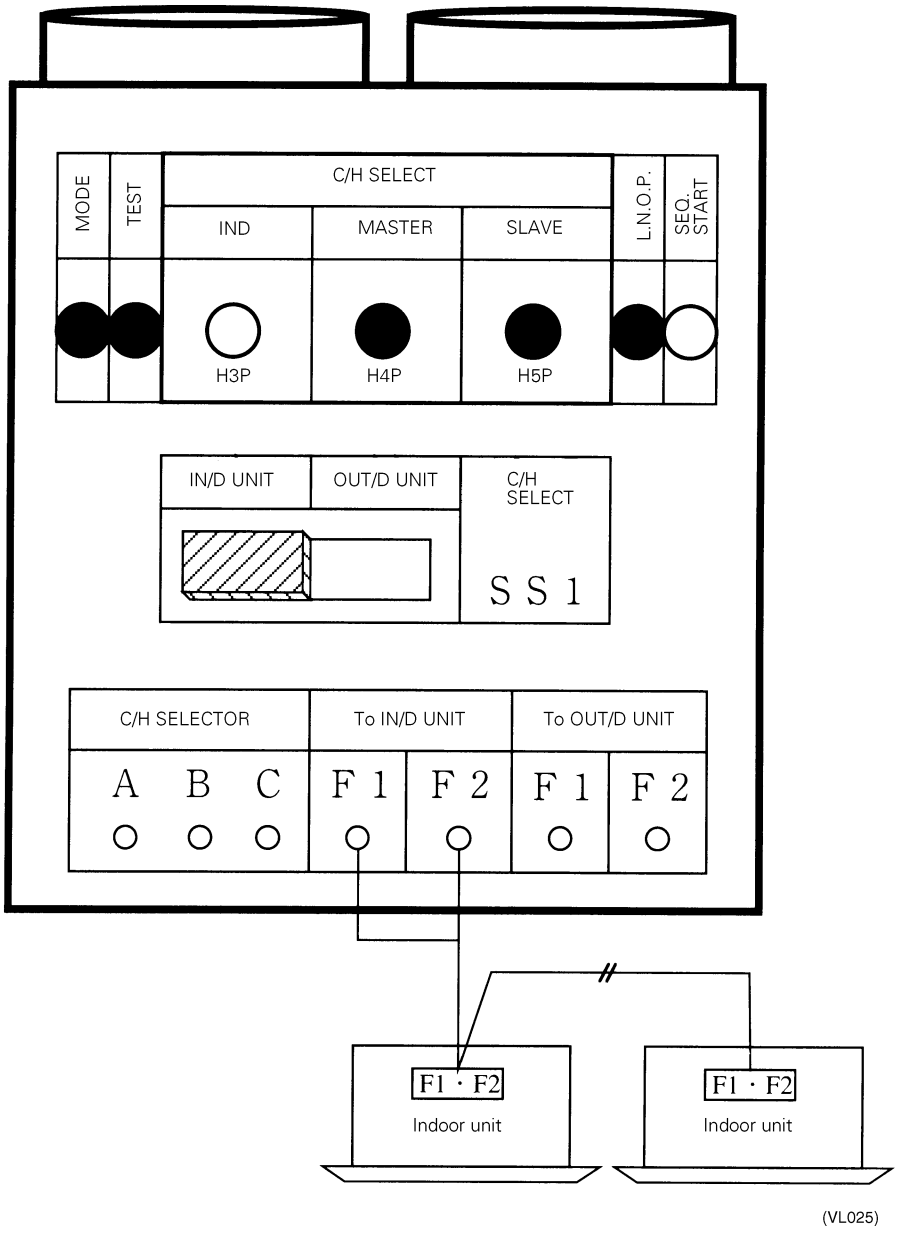
The UM Combination “MA1R Series” Using R407C offers the following four cool/heat mode selections.

1. Setting of cool/heat by individual outdoor unit system by indoor unit remote controller
2. Setting of cool/heat by individual outdoor unit system by cool/heat selector
3. Setting of cool/heat by outdoor unit system group in accordance with group master outdoor unit by indoor unit remote controller
4. Setting of cool/heat by outdoor unit system group in accordance with group master outdoor unit by cool/heat selector

Each of these setting methods is explained in detail below.
(For **3** and **4** be sure to perform power supply reset after changing settings.)

1.5.1 Setting of Cool / Heat by Individual Outdoor Unit System by Indoor Unit Remote Controller

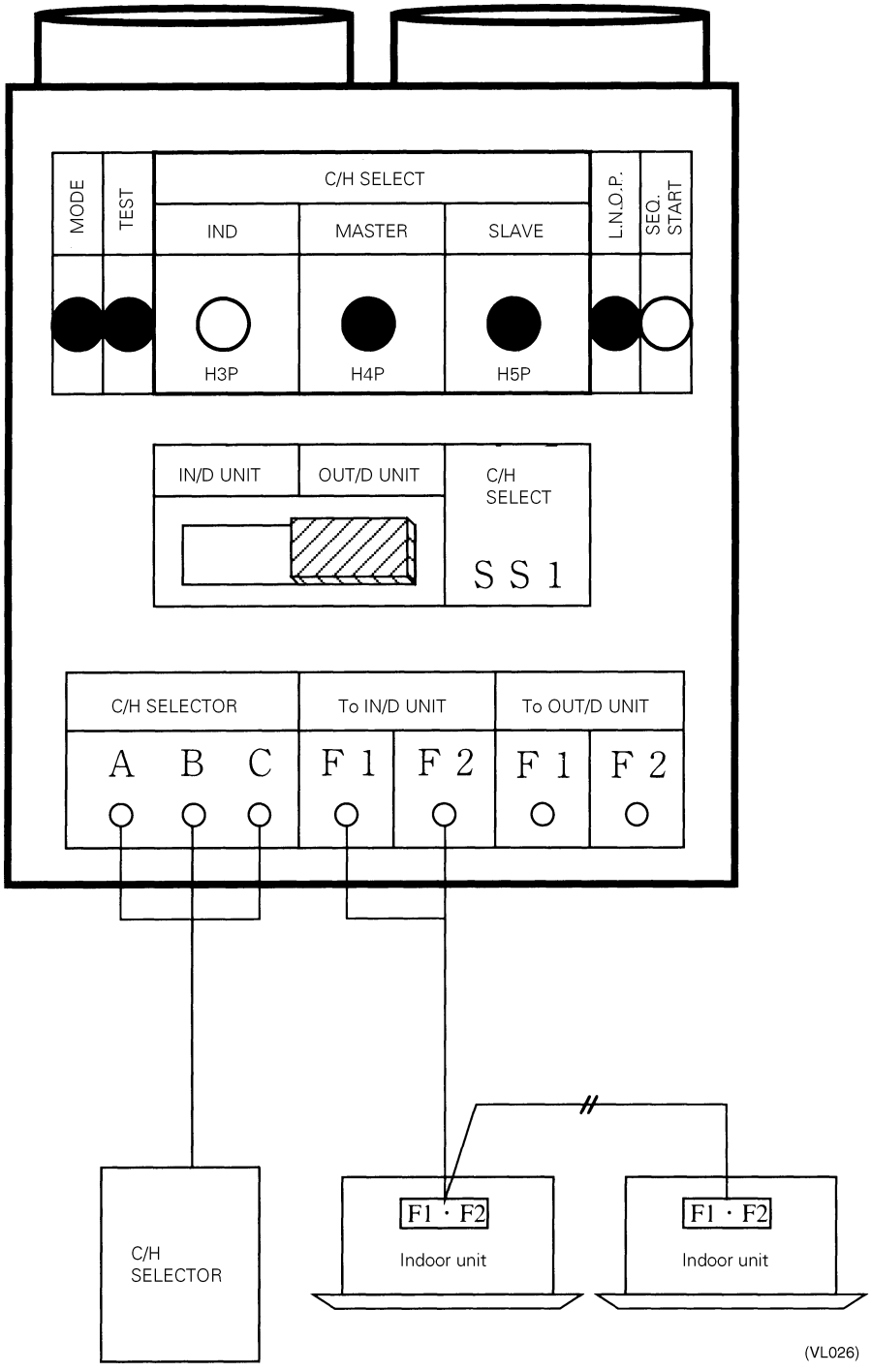
- Doesn’t matter whether or not there is outdoor - outdoor unit wiring.
- Set SS1 of the outdoor unit PCB to “IN / D UNIT” (factory set).
- In setting mode 1, set cool/heat selection to “IND” (factory set).



(VL025)

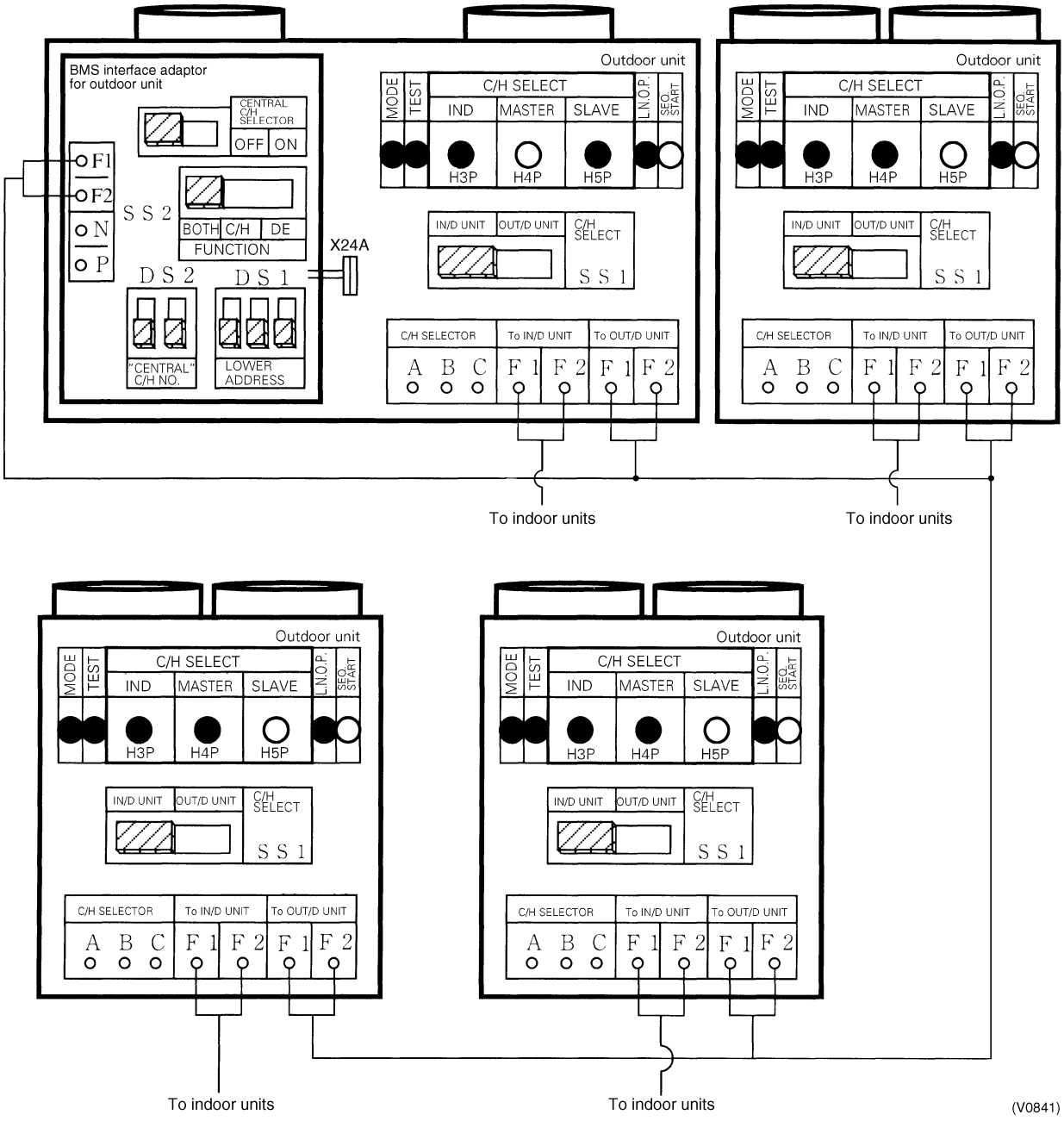
1.5.2 Setting of Cool / Heat by Individual Outdoor Unit System by Cool/Heat Selector

- Doesn't matter whether or not there is outdoor - outdoor unit wiring.
- Set SS1 of the outdoor unit PC board to "OUT / D UNIT."
- In setting mode 1, set cool/heat selection to "IND" (factory set).



1.5.3 Setting of Cool / Heat by Outdoor Unit System Group in Accordance with Group Master Outdoor Unit by Indoor Unit Remote Controller

- Install the BMS interface adaptor for outdoor unit on either the outdoor - outdoor, indoor - outdoor, or indoor - indoor transmission line.
- Set SS1 of the outdoor unit PCB to “IN / D UNIT” (factory set).
- In setting mode 1, set the outdoor unit you want to give cool/heat selection permission to as the group master, and set the other outdoor units as group slave units.
- Set SS1 of the BMS interface adaptor for outdoor unit to “BOTH” (factory set) or “C / H.” Set SS2 to “OFF” (factory set).



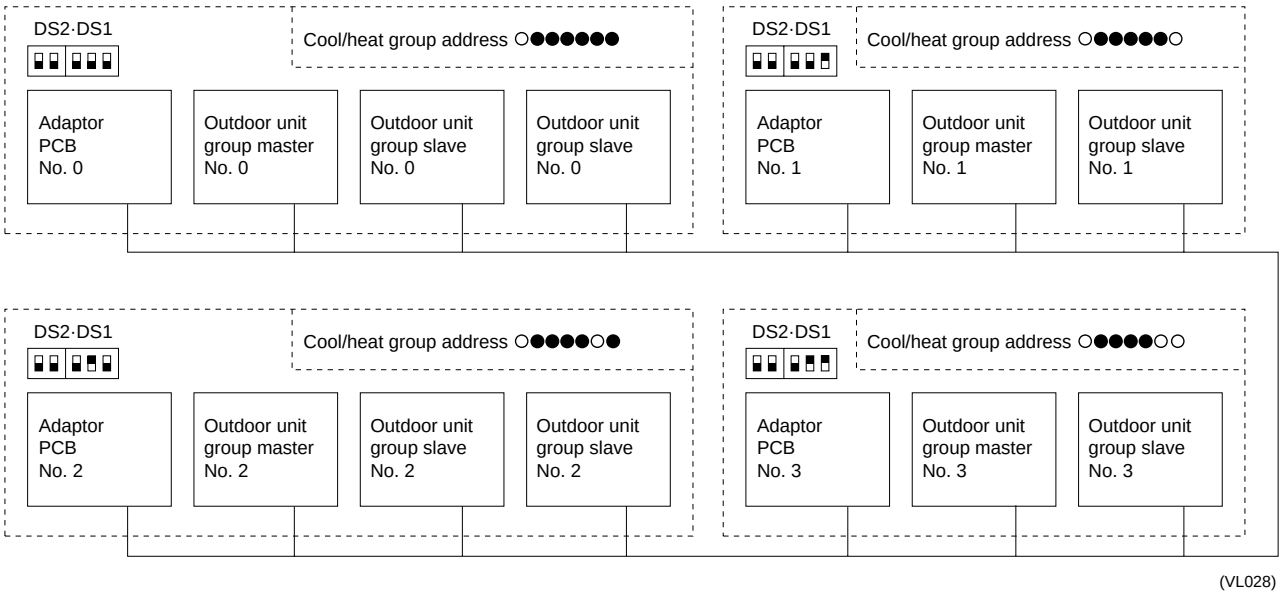
1.5.4 Setting of Cool / Heat by Outdoor Unit System Group in Accordance with Group Master Outdoor Unit by Cool/Heat Selector

- In addition to **1.5.3**, change the following:
- Install a cool / heat selector to the group master outdoor unit.
- Set SS1 of the group master outdoor unit’s PCB to “OUT / D UNIT.”

Supplement

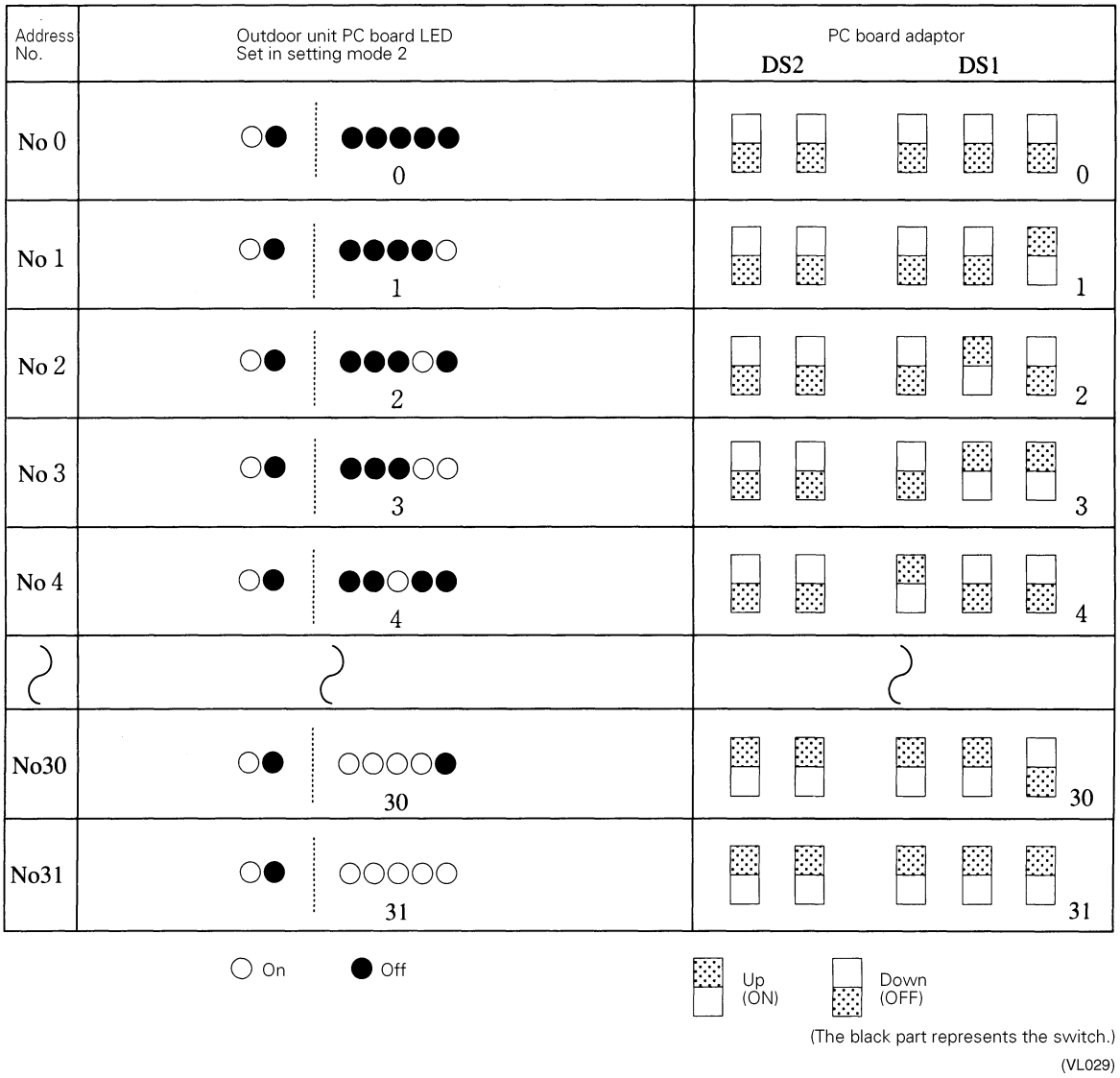
■ Supplement to **1.5.3** and **1.5.4**

If using several adaptor PCB and you want to select cool/heat mode for each adaptor PCB, set DS1 / DS2 of the adaptor PCB and the cool/heat group address on the outside unit's PCB to the same setting in setting mode 2.


DS2·DS1
Cool/heat group address ○●●●●●●
Adaptor PCB No. 0
Outdoor unit group master No. 0
Outdoor unit group slave No. 0
Outdoor unit group slave No. 0
DS2·DS1
Cool/heat group address ○●●●●●○
Adaptor PCB No. 1
Outdoor unit group master No. 1
Outdoor unit group slave No. 1
DS2·DS1
Cool/heat group address ○●●●●○●
Adaptor PCB No. 2
Outdoor unit group master No. 2
Outdoor unit group slave No. 2
Outdoor unit group slave No. 2
DS2·DS1
Cool/heat group address ○●●●●○○
Adaptor PCB No. 3
Outdoor unit group master No. 3
Outdoor unit group slave No. 3

(VL028)

Setting Methed **1.5.3** and **1.5.4** address setting method (combine lower 5 digits as binary number)



1.6 Low Noise Operation

By connecting the external contact input to the low noise input of the BMS interface adaptor for outdoor unit (optional), you can save power and lower operating noise by 2 -3 dB.

Instructions for Demand Control Operation

1. Outdoor unit field setting

◆ Setting mode 1: Set low noise operation to “ON.”

◆ Setting mode 2: Match low noise operation and demand control address with address of BMS interface adaptor for outdoor unit.

2. BMS interface adaptor for outdoor unit setting

◆ Function switch (SS1)

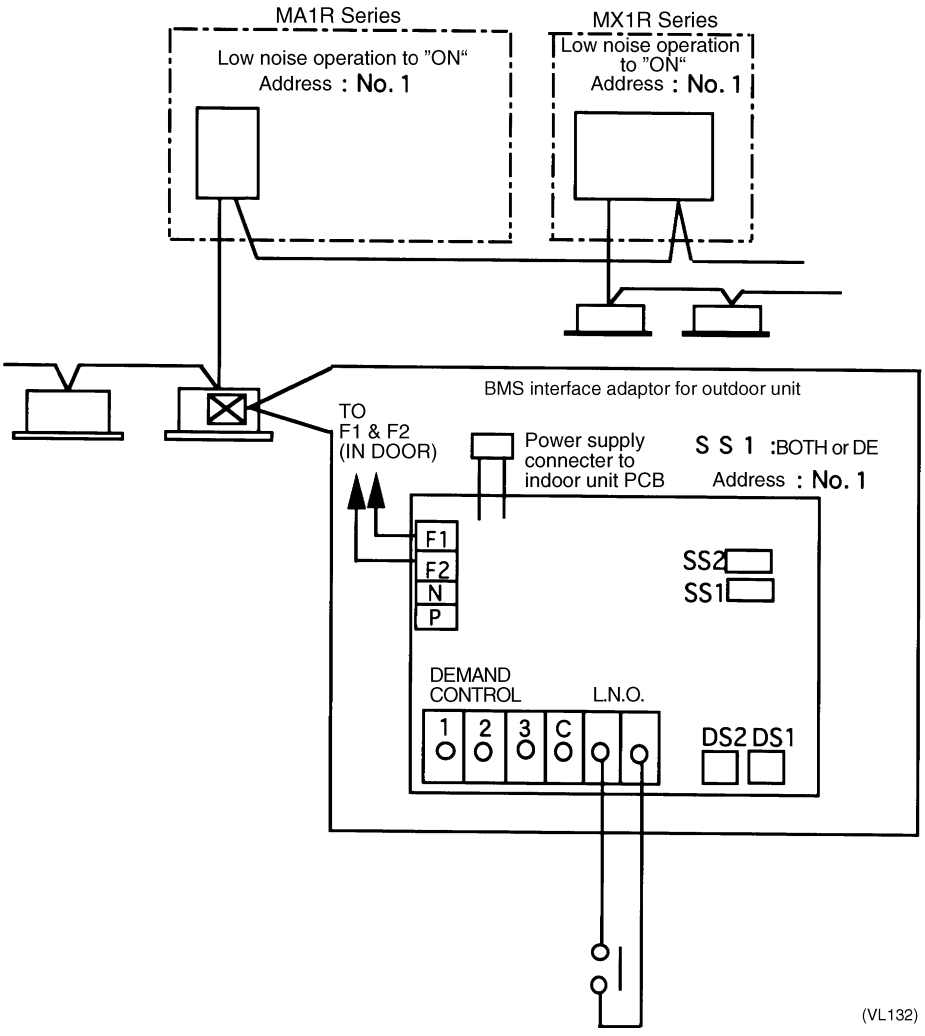
Set to “BOTH” or “DE.”

◆ Address setting switches (DS1, DS2)

Match with outdoor unit low noise operation and demand control address.

3. Short-circuit the low noise input of BMS interface adaptor for outdoor unit.

Low Noise Control System Example



1.7 Demand Control

By connecting the external contact input to the demand input of the BMS interface adaptor for outdoor unit (option), the compressor operating conditions can be controlled for reduced power consumption.

- Demand 1 Approximately 70% level
- Demand 2 Approximately 40% level
- Demand 3 Forced thermostat OFF

Instructions for Demand Control Operation

1. Outdoor unit field setting

◆ Setting mode 1: Set low noise operation to “ON.”

◆ Setting mode 2: Match low noise operation and demand control address with address of BMS interface adaptor for outdoor unit.

2. BMS interface adaptor for outdoor unit setting

◆ Function switch (SS1)

Set to “BOTH” or “DE.”

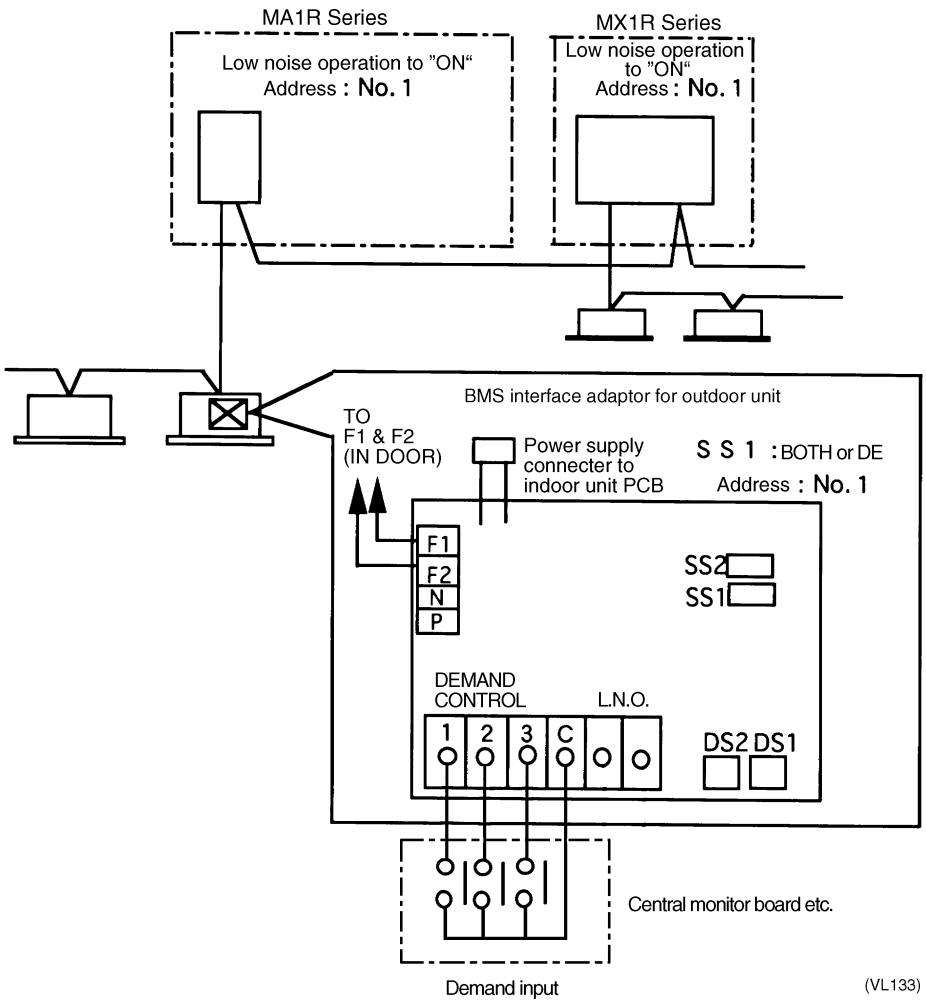
◆ Address setting switches (DS1, DS2)

Match with outdoor unit low noise operation and demand control address.

3. Select one from demand input terminals 1 through 3 on the BMS interface adaptor for outdoor unit, and short the corresponding terminals.

- Demand 1 Short 1-C.
- Demand 2 Short 2-C.
- Demand 3 Short 3-C.

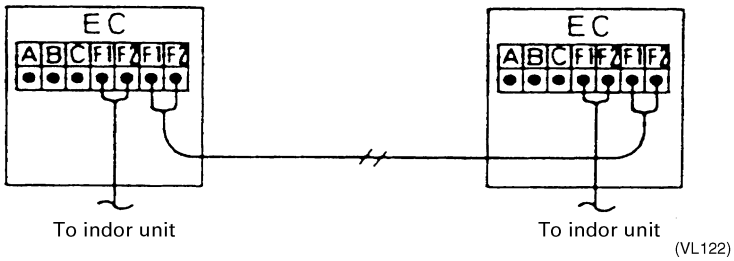
Demand Control System Example

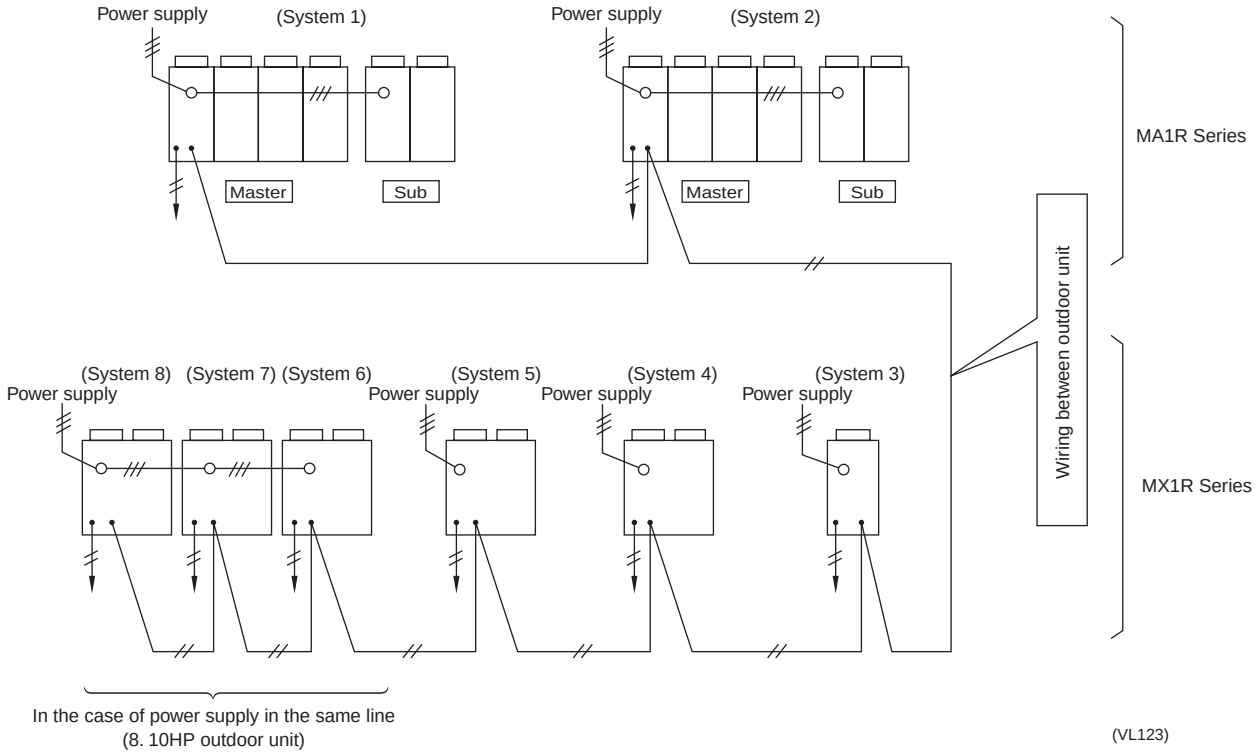


1.8 Sequential Start

- Separates path timing of commercial power supply compressors by 3 seconds each in order to prevent overcurrent when more than 1 compressor are to be started at the same time.
- Wiring system enables sequential start of up to 10 outdoor units.

If you want to carry out sequential start, connect outdoor unit - outdoor unit transmission wiring as shown below.
The outdoor unit PC board (EC) is factory set to “sequential start ON.”



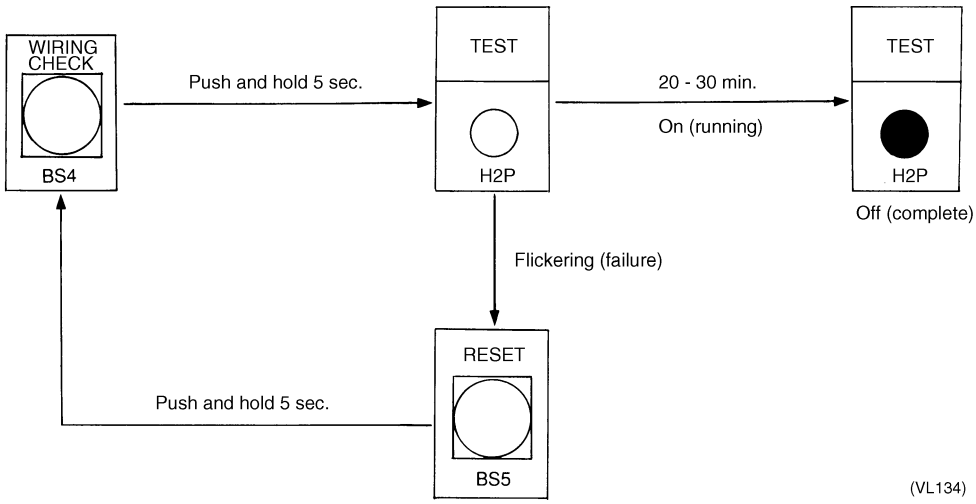


1.9 Wiring Check Operation

If within 12 hours of stopping cooling or heating, be sure to run all indoor units in the system you want to check in the fan mode for about 60 minutes in order to prevent mis-detection.

Operation Method

1. In the monitor mode, check the number of connected indoor units. (See monitor mode.)
2. Push and hold the WIRING CHECK button (BS4) for 5 seconds to perform wiring check operation. While running, TEST (H2P) lights and goes off when finished.
   If TEST (H2P) flickers (wiring check operation failure), push and hold the RESET button (BS5) for 5 seconds, and then repeat the procedure from the beginning.
3. About 1 minute after you finish running the system, once again check the number of connected indoor units in the monitor mode and make sure the number agrees with the first time you checked. If not, it indicates that there is a wiring mistake. Fix the wiring of the indoor unit whose remote controller displays “UF” when its ON/OFF switch is turned ON.



Note: Other settings are not accepted during wiring check operation.

1.10 Additional Refrigerant Charge Operation

[Work procedure]

1. Conduct ordinary refrigerant charge.
   With the outdoor unit in non-operating condition, charge refrigerant from the liquid-side stop valve service port.
   (Keep the stop valves on both liquid and gas sides closed.)

■ **Conduct the following operation only when the entire amount of refrigerant could not be charged with the compressor in non-operating condition (otherwise equipment damage can result).**

2. Turn on the power switches of the indoor and outdoor units, and fully open the gas-side stop valve.
   (Keep the liquid-side stop valve closed.)

3. Set the service mode.

In service mode 1, press the “MODE” button for 5 seconds to enter service mode 2.		○ ● ● ● ● ● ●
Press the “SET” button to set the LED indicators to the "additional refrigerant charge operation" indication.		○ ● ○ ● ○ ● ●
Press the “RETURN” button.		○ ● ● ● ● ● ◑
Press the “SET” button to set the LED indicators as shown at right.		○ ● ● ● ● ◑ ●
Press the “RETURN” button to end the setting operation.		○ ● ● ● ● ○ ●
Press the “RETURN” button again to start operation.		◑ ◑ ● ● ● ● ●
Low pressure level is indicated during operation.	Higher than 3.5k	○ ○ ○ ○ ○ ○ ○
	3.5k or less	○ ○ ● ● ○ ○ ○
	2.5k or less	○ ○ ● ● ● ○ ○
	1.5k or less	○ ○ ● ● ● ● ○
Operation ends (after 30 minutes). (Pressure level immediately before is indicated by flashing LEDs.)		○ ○ ● ● ● ◑ ◑ This LED indication shows that the operation stopped with pressure level at [2.5 k or lower].
Push “Mode” button once to complete additional refrigerant change.		○ ● ● ● ● ○ ●

4. The refrigerant charge is completed when the specified amount of refrigerant is added. If the refrigerant charge operation is not completed in 30 minutes, make the settings again and restart the operation.
   (When the Confirmation button is pressed during additional refrigerant charge operation, the operation stops.)

5. Disconnect the refrigerant charge hose, then fully open the liquid-side stop valve.

1.11 Refrigerant Recovery Mode

■ **The electronic expansion valves in the indoor and outdoor units are fixed in the fully open position for refrigerant recovery.**

[Work procedure]

1. Stop equipment operation.

2. Set the service mode.

In service mode 1, press the “MODE” button for 5 seconds to enter service mode 2.	○ ● ● ● ● ● ●
Press the “SET” button to set the LED indicators to the "refrigerant recovery mode" indication.	○ ● ○ ● ○ ● ○
Press the “RETURN” button.	○ ● ● ● ● ● ◑
Press the “SET” button to set the LED indicators as shown at right.	○ ● ● ● ● ◑ ●
Press the “RETURN” button to end the setting operation.	○ ● ● ● ● ○ ●

3. Turn off the power switches of the indoor and outdoor units.
   (Turn off the power switch of one unit, then turn off the power switch of the other unit within 10 minutes.)

4. Conduct refrigerant recovery.

5.

Press the “RETURN” button again to return to initial status.	○ ● ● ● ● ● ●

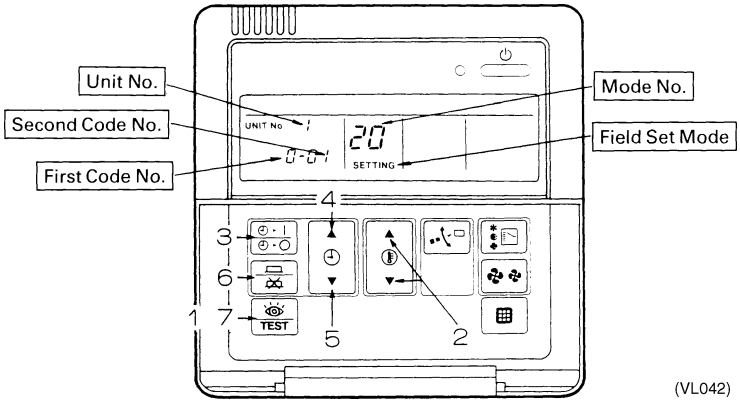
■ Cancel the setting in the setting mode or cancel the mode by conducting power reset of the outdoor unit.

1.12 Indoor Field Setting

Making a field setting

Field settings must be made by remote controller if optional accessories have been installed on the indoor unit.

1.12.1 Wired Remote Controller <CZ-01RT Type>



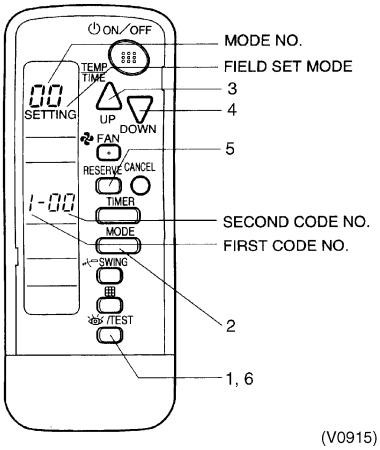
(VL042)

1. When in the normal mode, push the TEST button for 4 seconds or more, and operation then enters the “field set mode.”
2. Select the desired “mode No.” with the button.
3. During group control and you want to set by each individual indoor unit (when mode No. 20, 21, 22, 23, 25 has been selected), push the time mode button and select the “indoor unit No.” to be set.
   Note: This operation is not required when setting as a group.
4. Push the button and select the first code No.
5. Push the button and select the second code No.
6. Push the timer button one time and “define” the currently set contents.
7. Push the TEST button to return to the normal mode.

(Example)

When setting the filter sign time to “Filter Dirtiness-High” in all group unit setting, set the Mode No. to “10”, Mode setting No. to “0” and setting position No. to “02”.

1.12.2 Wireless Remote Controller <CZ-01·02RW Type>



(V0915)

1. When in the normal mode, push the /TEST button for 4 seconds or more, and operation then enters the “field set mode.”
2. Select the desired “mode No.” with the MODE button.
3. Pushing the UP button, select the first code No.
4. Pushing the DOWN button, select the second code No.
5. Push the RESERVE button and check the settings.
6. Push the /TEST button to return to the normal mode.

1.12.3 Setting Contents and Code No.

UM series indoor unit settings	Mode No. Note 2	Setting Switch No.	Setting Contents		Second Code No.(Note 3)							
					01		02		03		04	
	10(20)	0	Filter contamination heavy/light (Setting for display time to clean air filter) (Sets display time to clean air filter to half when there is heavy filter contamination.)	Super long life filter	Light	Approx. 10,000 hrs.	Heavy	Approx. 5,000 hrs.	—		—	
				Long life filter		Approx. 2,500 hrs.		Approx. 1,250 hrs.				
				Standard filter		Approx. 200 hrs.		Approx. 100 hrs.				
		1	Long life filter type (CS-LM only, 01 indicates long life)		Long life filter		Super long life filter		—		Soot filter	
		2	Thermostat sensor in remote controller		Use		No use		—			
		3	Display time to clean air filter calculation (Set when filter sign is not to be displayed.)		Display		No display		—			
	12(22)	0	Optional accessories output selection (field selection of output for adaptor for wiring)		Indoor unit turned ON by thermostat				Operation output		Malfunction output	
		1	ON/OFF input from outside (Set when ON/OFF is to be controlled from outside.)		Forced OFF		ON/OFF control		External protection device		—	
		2	Thermostat differential changeover (Set when remote sensor is to be used.) CS-LM, CS-UM, CS-TM only		1°C		0.5°C		—		—	
		3	OFF by thermostat fan speed		LL		Set fan speed		—		—	
		4	Automatic mode differential (automatic temperature differential setting for UM heat recovery inverter series “ME1R Series”)		01:0	02:1	03:2	4:03	05:4	6:05	7:06	08:7
		5	Power failure automatic reset		Not equipped		Equipped		—		—	
	13(23)	0	High air outlet velocity (Set when installed in place with ceiling higher than 2.7 m.) CS-UM only		N		H		—		—	
		1	Selection of air flow direction (Set when a blocking pad kit has been installed.) CS-UM only		F (4 directions)		T (3 directions)		W (2 directions)		—	
		2	Horizontal air discharge		Equipped		Not equipped				—	
		3	Air flow direction adjustment (Set at installation of decoration panel.) CS-DM only		Equipped		Not equipped				—	
		4	Field set air flow position setting		Draft prevention		Standard		Ceiling Soiling prevention		—	
		5	Field set fan speed selection (fan speed control by air discharge outlet for phase control)		Standard		Optional accessory 1		Optional accessory 2		—	
	15(25)	1	Thermostat OFF excess humidity		Not equipped		Equipped		—		—	
		3	Drain pump humidifier interlock selection		Not equipped		Equipped		—		—	
		4	Sets whether filter sign is to be output by time or by input.		Time addition		Input		—		—	
		5	Field set selection for individual ventilation setting by remote controller		Not equipped		Equipped		—		—	
		6	Field set selection for individual ventilation setting by remote controller		Not equipped		Equipped		—		—	

Notes:

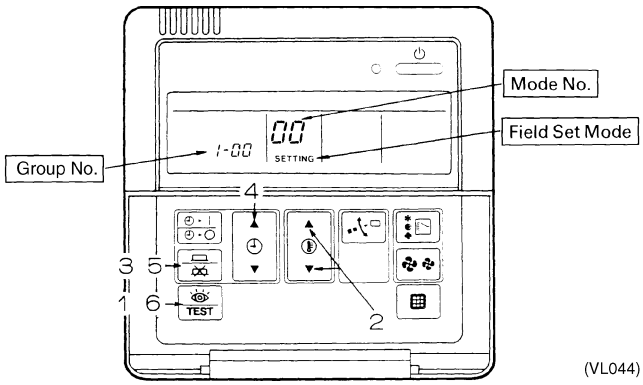
1. Settings are made simultaneously for the entire group, however, if you select the mode No. inside parentheses, you can also set by each individual unit. Setting changes however cannot be checked except in the individual mode for those in parentheses.
2. The mode numbers inside parentheses cannot be used by wireless remote controllers, so they cannot be set individually. Setting changes also cannot be checked.
3. Mode numbers 17 (27) and 19 (29) are HRV functions that can be set from an UM Series remote controller.
4. The second code No. is factory set to “01.” The field set air flow position setting is however factory set to “02”.
5. Do not make settings other than those described above. Nothing is displayed for functions the indoor unit is not equipped with.
6. “88” may be displayed to indicate the remote controller is resetting when returning to the normal mode.

1.13 Centralised Control Group No. Setting

CZ-01RT Type

- If carrying out centralised control by central remote controller or unified ON/OFF controller, group No. must be set for each group individually by remote controller.
- Group No. setting by remote controller for centralized control

1. When in the normal mode, push the TEST button for 4 seconds or more, and operation then enters the “field setting mode.”
2. Set mode No. “00” with the button. *
3. Push the button to inspect the group No. display.
4. Set the group No. for each group with the button (The group No. increases in the manner of 1-00, 1-01, ...,1-15, 2-00,...4-15. However, the unified ON/OFF controller displays only the group No. within the range selected by the switch for setting each address.)
5. Push the timer button to define the selected group No.
6. Push the TEST button to return to the normal mode.



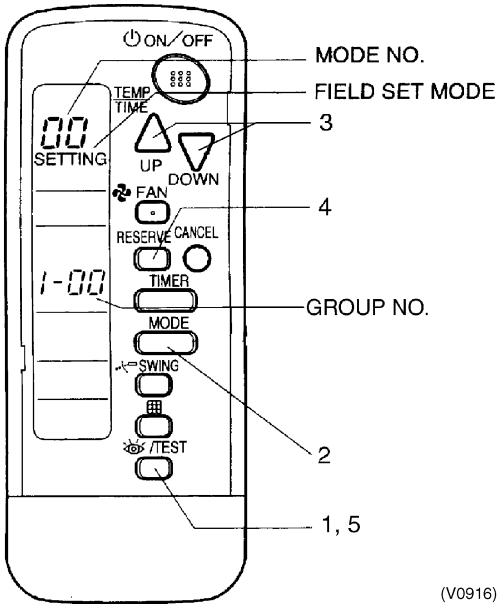
(VL044)

- Even if not using a remote controller, connect the remote controller when setting the group No., set the group No. for centralized control, and disconnect after making the setting.
- Set the group No. after turning on the power supply for the central remote controller, unified ON/OFF controller, and indoor unit.

CZ-01·02RW Type

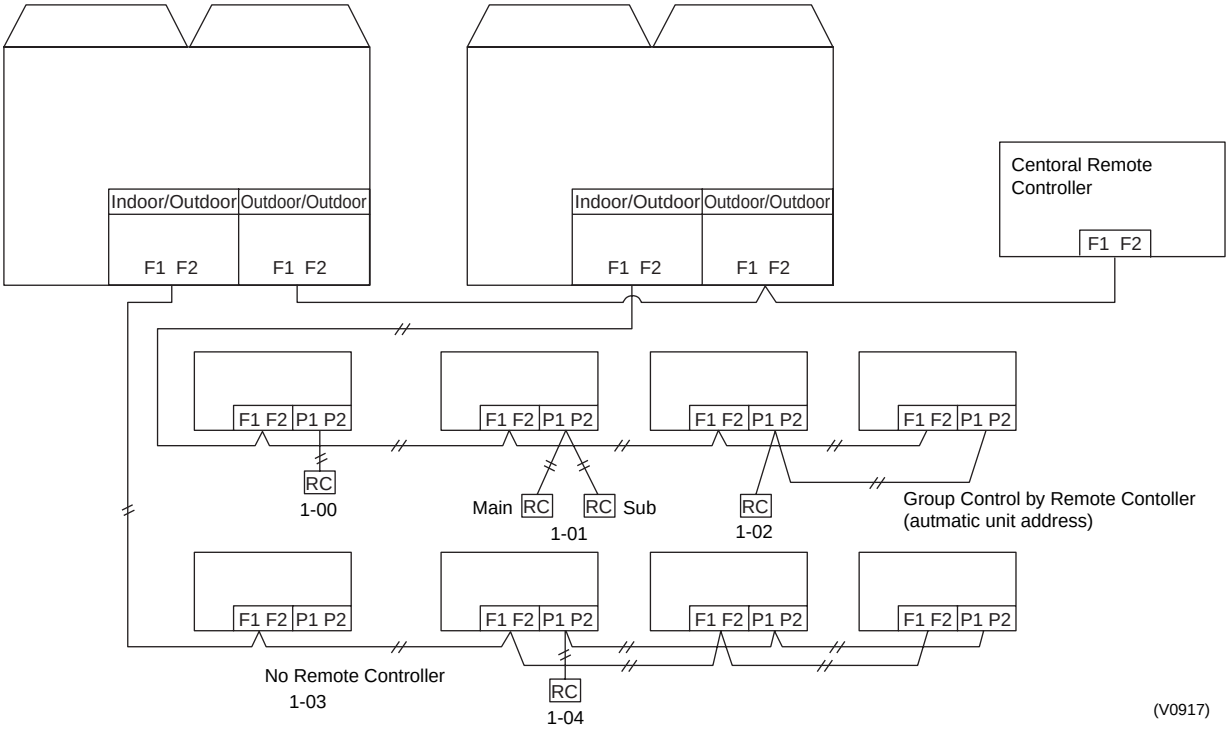
- Group No. setting by wireless remote controller for centralised control

1. When in the normal mode, push the /TEST button for 4 seconds or more, and operation then enters the “field set mode.”
2. Set mode No. “00” with the MODE button.
3. Set the group No. for each group with the UP DOWN button (advance/backward).
4. Enter the selected group numbers by pushing the RESERVE button.
5. Push the /TEST button and return to the normal mode.



(V0916)

Group No. Setting Example



- If you have to set the address for each unit for calculating cost, etc., set the mode No. to “30.”

Caution When turning the power supply on, the unit may often not accept any operation while "88" is displaying after all indications were displayed once for about 1 minute on the liquid crystal display.
This is not an operative fault.

1.14 Contents of Control Modes

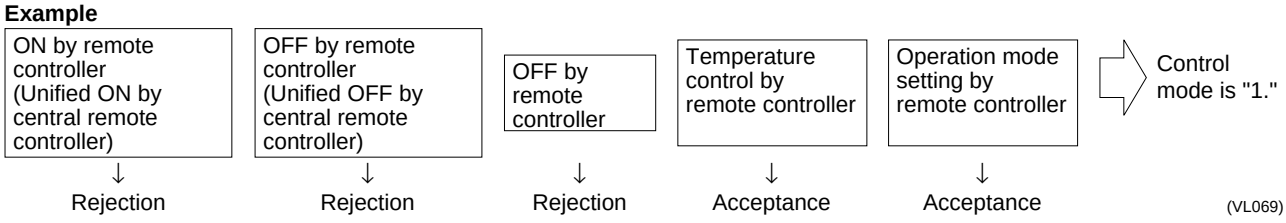
Twenty modes consisting of combinations of the following five operation modes with temperature and operation mode setting by remote controller can be set and displayed by operation modes 0 through 19.

- ON/OFF control impossible by remote controller
  Used when you want to turn on/off by central remote controller only.
  (Cannot be turned on/off by remote controller.)
- OFF control only possible by remote controller
  Used when you want to turn on by central remote controller only, and off by remote controller only.
- Centralized
  Used when you want to turn on by central remote controller only, and turn on/off freely by remote controller during set time.
- Individual
  Used when you want to turn on/off by both central remote controller and remote controller.
- Timer operation possible by remote controller
  Used when you want to turn on/off by remote controller during set time and you do not want to start operation by central remote controller when time of system start is programmed.

How to Select Operation Mode

Whether operation by remote controller will be possible or not for turning on/off, controlling temperature or setting operation mode is selected and decided by the operation mode given on the right edge of the table below.

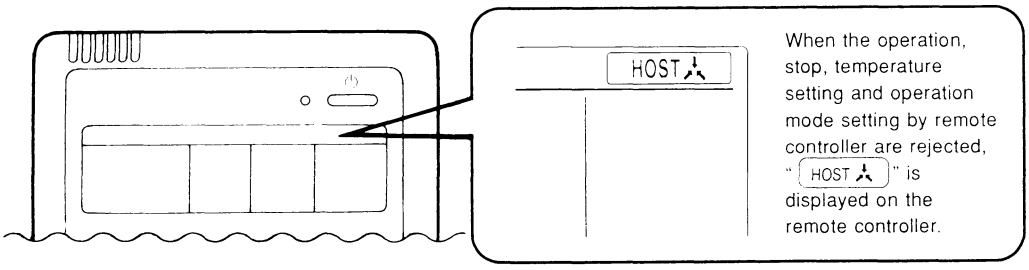
Example



Control mode	Control by remote controller					Control mode
	Operation		OFF	Temperature control	Operation mode setting	
	Unified operation, individual operation by central remote controller, or operation controlled by timer	Unified OFF, individual stop by central remote controller, or timer stop				
ON/OFF control impossible by remote controller	Rejection (Example)	Rejection (Example)	Rejection (Example)	Rejection	Acceptance	0
					Rejection	10
				Acceptance (Example)	Acceptance (Example)	1(Example)
					Rejection	11
OFF control only possible by remote controller			Acceptance	Rejection	Acceptance	2
					Rejection	12
				Acceptance	Acceptance	3
					Rejection	13
Centralised	Acceptance			Rejection	Acceptance	4
					Rejection	14
				Acceptance	Acceptance	5
					Rejection	15
Individual		Acceptance		Rejection	Acceptance	6
					Rejection	16
				Acceptance	Acceptance	7 ∗1
					Rejection	17
Timer operation possible by remote controller	Acceptance (During timer at ON position only)	Acceptance (During timer at ON position only)		Rejection	Acceptance	8
					Rejection	18
				Acceptance	Acceptance	9
					Rejection	19

Do not select “timer operation possible by remote controller” if not using a remote controller. Operation by timer is impossible in this case.

∗1. Factory setting


HOST
When the operation, stop, temperature setting and operation mode setting by remote controller are rejected, " HOST " is displayed on the remote controller.

(VL070)

Part 4
Troubleshooting

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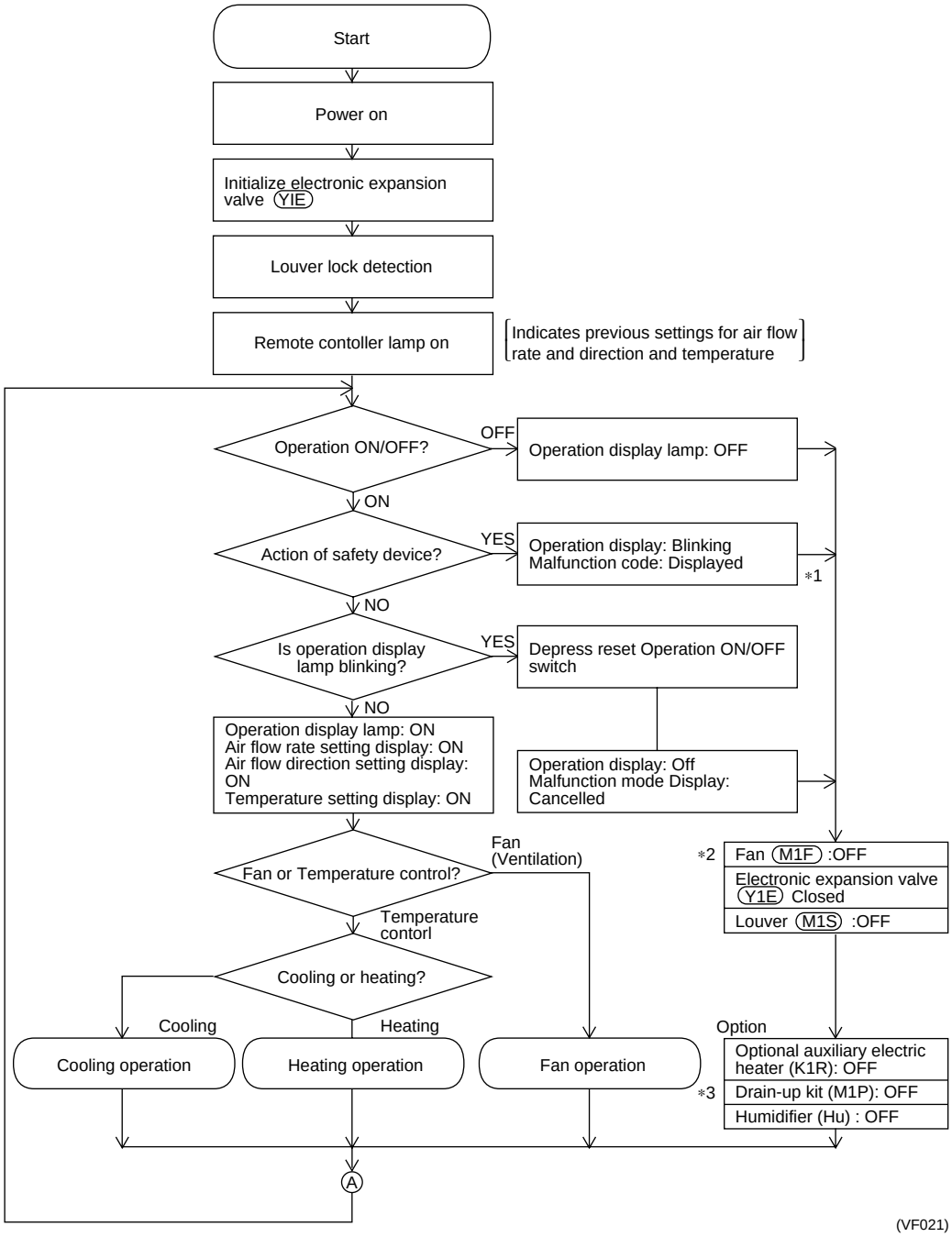
1. Operation Flowcharts

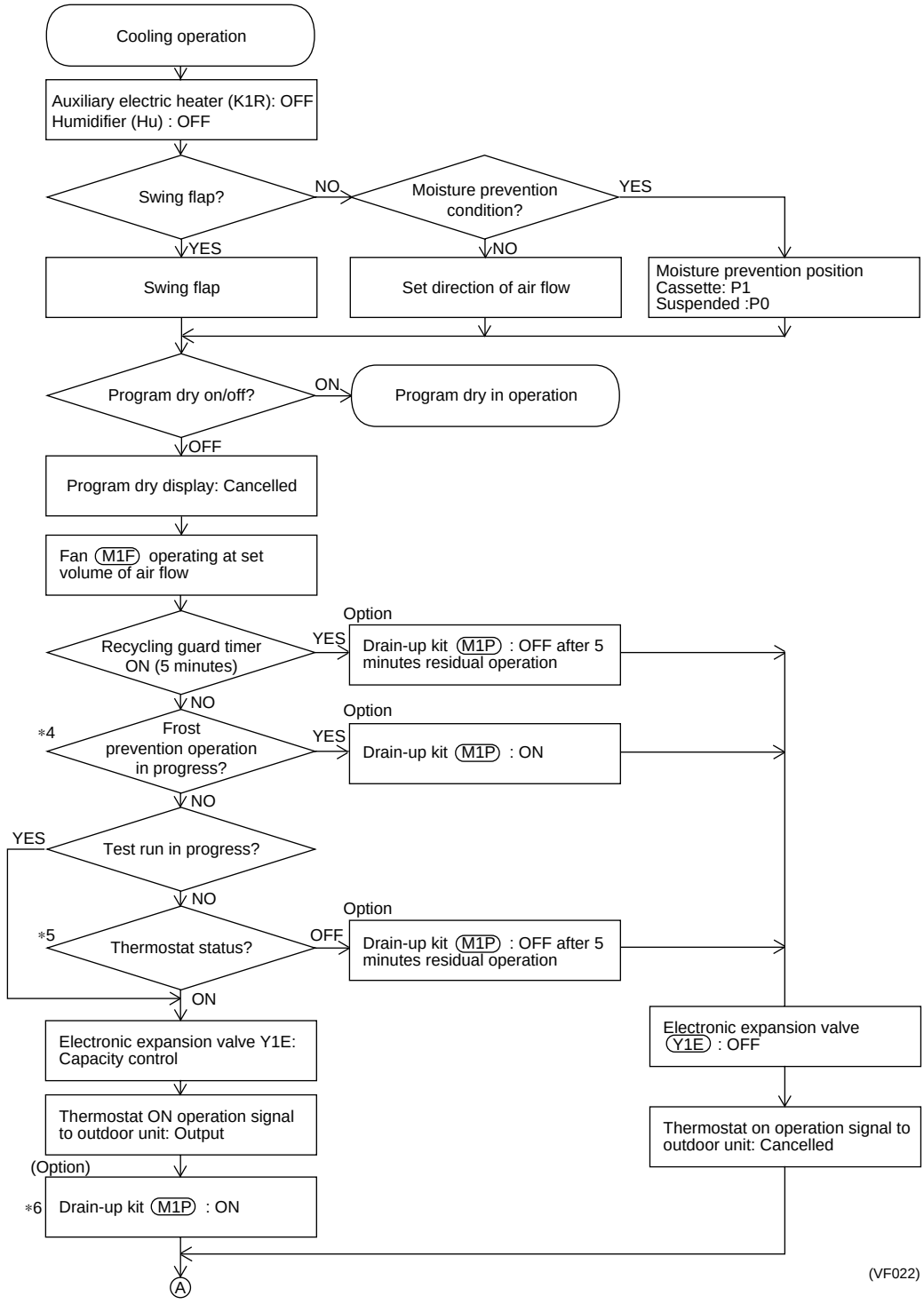
1.1 Indoor Unit Operation Flowchart



∗1 In the event of a malfunction, the malfunction code is displayed in the remote controller's malfunction code display.

∗2 When the auxiliary electric heater is on, the fan stops after one minute residual operation.

∗3 When the drain-up kit is ON, it stops after five minutes residual operation.

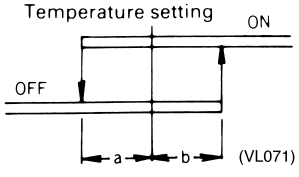


∗4 If the evaporator inlet temperature is -5°C or lower for a total of 10 minutes, or is -1°C or lower for a total of 40 minutes, frost prevention operation is initiated. Normal operation resumes when the temperature is +7°C or higher for 10 consecutive minutes.

∗5 Thermostat status

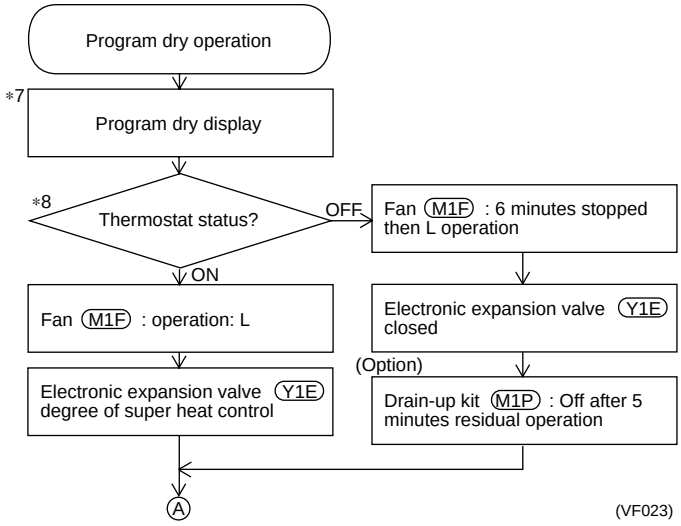
∗6 The drain-up kit is standard equipment for models CS-LM, CS-UM, CS-DM and CS-FM.

Preset temperature



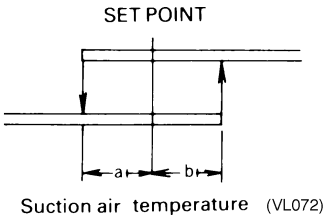
Intake air temperature

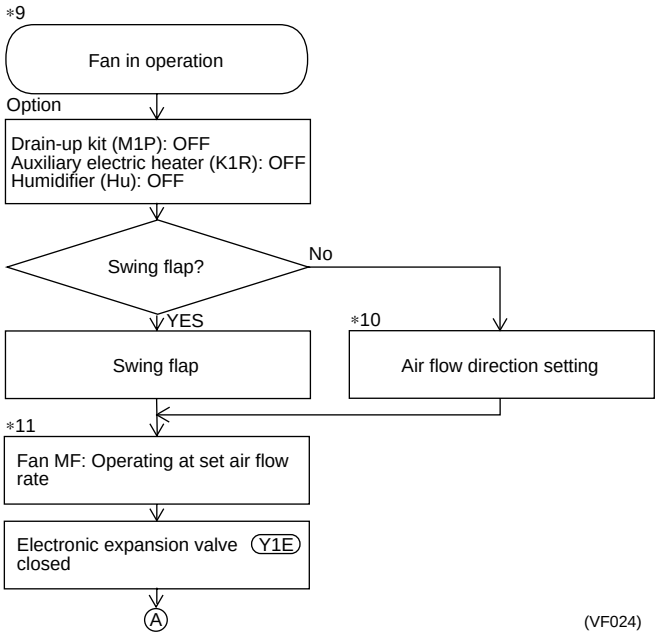
a = b = 1 (a = b = 0.5 possible for CS-LM, CS-UM, CS-TM CS-DM only.)



∗7 Programme dry display
Does not display preset temperature and air flow settings of the controller.

∗8 Thermostat status
Preset temperature during programme dry operation.

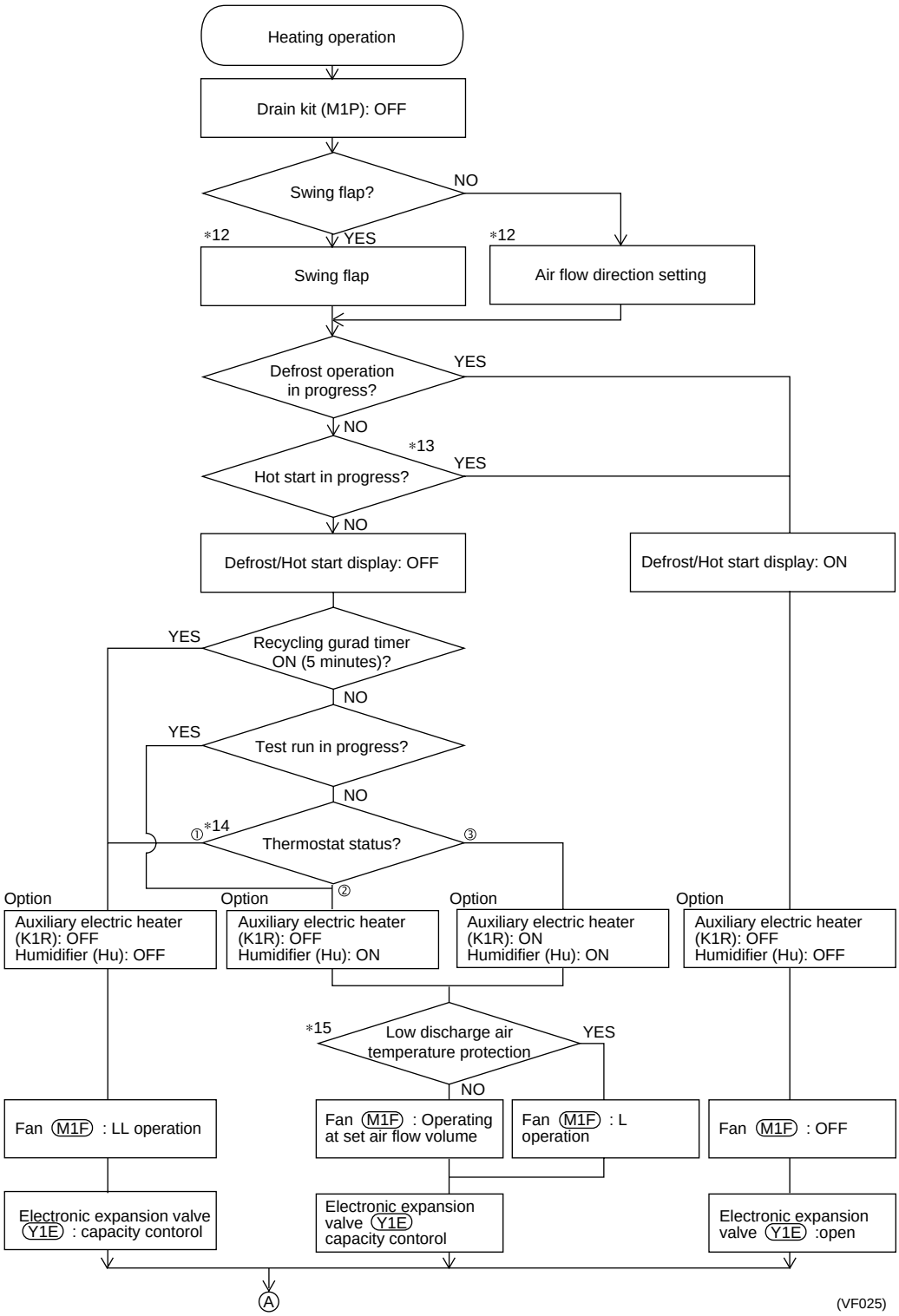




∗9 Fan operation
When fan operation has been selected using the remote controller, operation is turned OFF by thermostat when temperature control operation has been selected.

∗10 Air flow direction setting
If fan operation is selected with the remote controller, air discharge is 100% horizontal during heating.

∗11 Fan
If fan operation is selected with the remote controller, LL speed operation is carried out during heating.



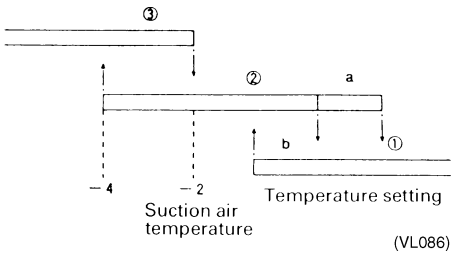
∗12 Air flow direction

Air discharge is 100% horizontal when heating operation is turned off by thermostat.

∗13 Hot start

Hot start is carried out when operation starts or defrosting is complete, and condenser inlet temperature exceeds 34°C, or 3 minutes elapses, or when Tc > 52°C.

∗14 Thermostat status

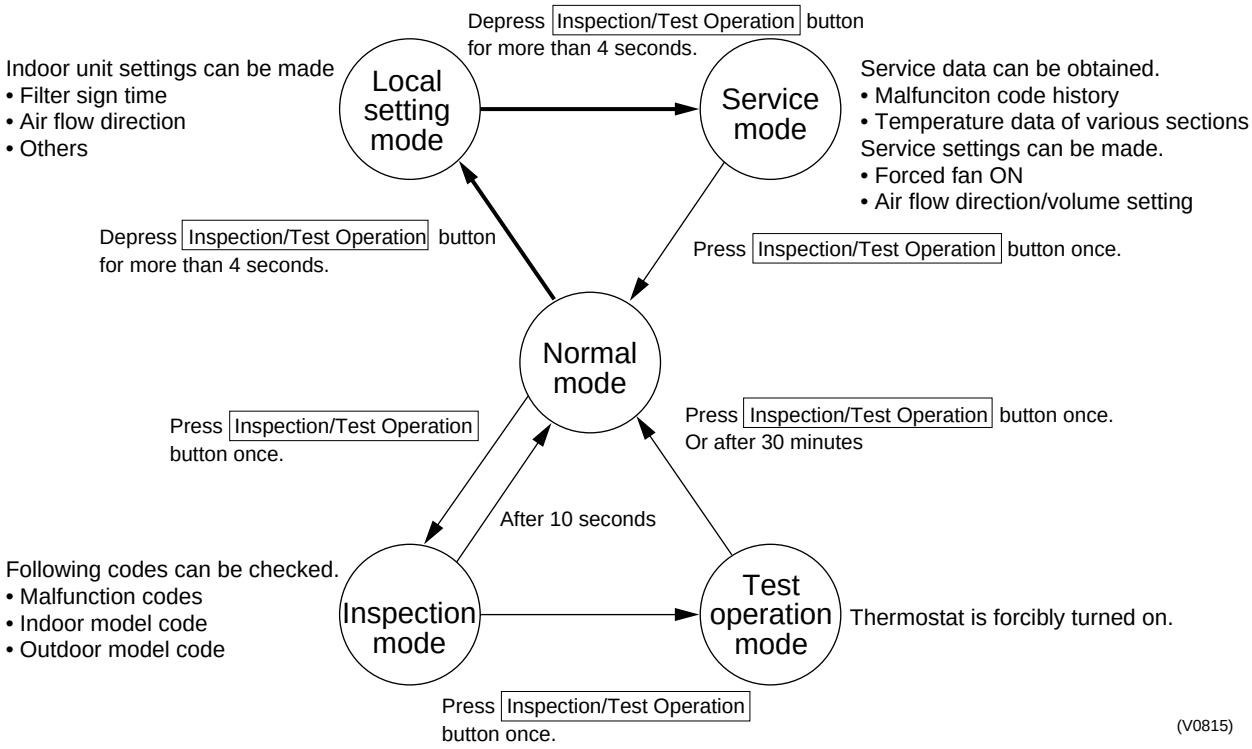


∗15 Low discharge air temperature protection
Protection is effected when the preset temperature is 24°C or lower and the opening of the electronic expansion valve is slight.

2. Troubleshooting by Remote Controller

2.1 The INSPECTION / TEST Button

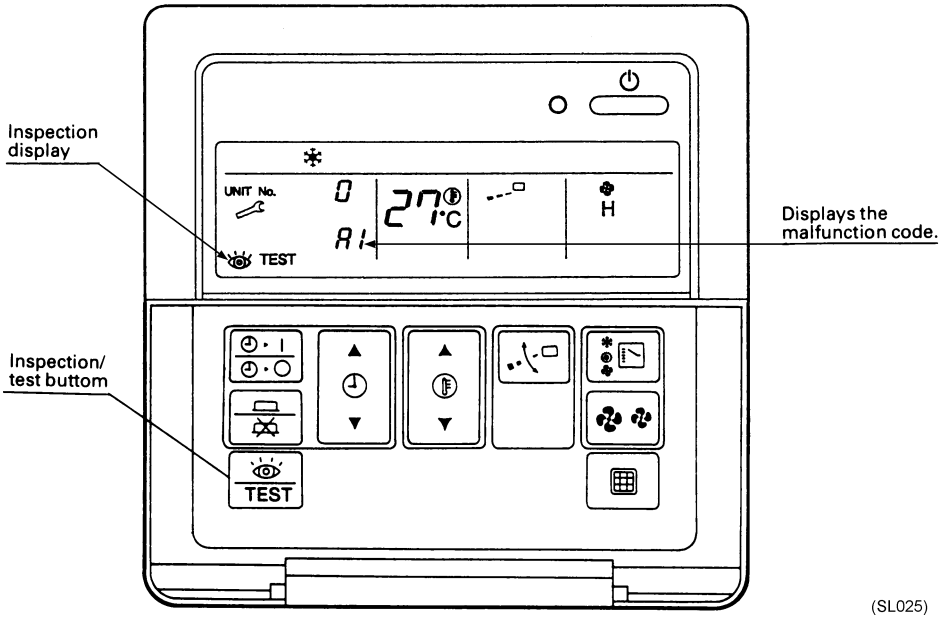
The following modes can be selected by using the [Inspection/Test Operation] button on the remote control.


Depress Inspection/Test Operation button for more than 4 seconds.
Indoor unit settings can be made
• Filter sign time
• Air flow direction
• Others
Local setting mode
Service mode
Service data can be obtained.
• Malfunciton code history
• Temperature data of various sections
Service settings can be made.
• Forced fan ON
• Air flow direction/volume setting
Depress Inspection/Test Operation button for more than 4 seconds.
Press Inspection/Test Operation button once.
Normal mode
Press Inspection/Test Operation button once.
Press Inspection/Test Operation button once.
Or after 30 minutes
After 10 seconds
Following codes can be checked.
• Malfunction codes
• Indoor model code
• Outdoor model code
Inspection mode
Test operation mode
Thermostat is forcibly turned on.
Press Inspection/Test Operation button once.
(V0815)

2.2 Self-diagnosis by Wired Remote Controller

Explanation

If operation stops due to malfunction, the remote controller's operation LED blinks, and malfunction code is displayed. (Even if stop operation is carried out, malfunction contents are displayed when the inspection mode is entered.) The malfunction code enables you to tell what kind of malfunction caused operation to stop. See page 496 for malfunction code and malfunction contents.



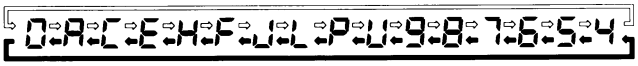
2.3 Self-diagnosis by Wireless Remote Controller

In the Case of CZ-01RW Type

If equipment stops due to a malfunction, the operation indicating LED on the light reception section flashes. The malfunction code can be determined by following the procedure described below. (The malfunction code is displayed when an operation error has occurred. In normal condition, the malfunction code of the last problem is displayed.)

1. Press the INSPECTION/TEST button to select “Inspection.”
   The equipment enters the inspection mode. The “Unit” indication lights and the Unit No. display shows flashing “0” indication.
2. Set the Unit No.
   Press the UP or DOWN button and change the Unit No. display until the buzzer (*1) is generated from the indoor unit.
   *1 Number of beeps
   3 short beeps : Conduct all of the following operations.
   1 short beep : Conduct steps 3 and 4.
   Continue the operation in step 4 until a buzzer remains ON. The continuous buzzer indicates that the malfunction code is confirmed.
   Continuous beep : No abnormality.
3. Press the MODE selector button.
   The left “0” (upper digit) indication of the malfunction code flashes.
4. Malfunction code upper digit diagnosis
   Press the UP or DOWN button and change the malfunction code upper digit until the malfunction code matching buzzer (*2) is generated.

■ The upper digit of the code changes as shown below when the UP and DOWN buttons are pressed.

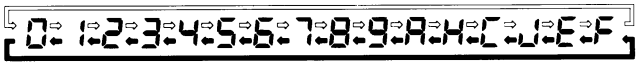


(SE006)

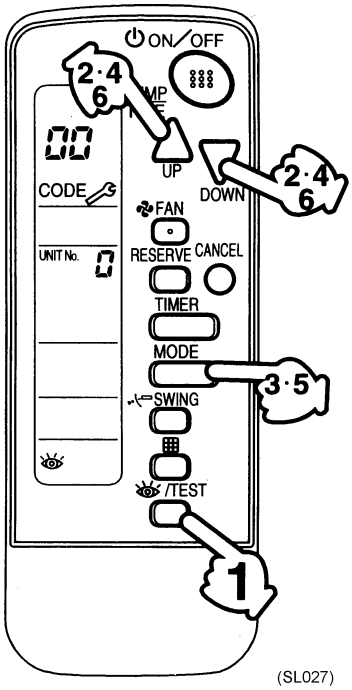
*2 Number of beeps
Continuous beep : Both upper and lower digits matched. (Malfunction code confirmed)
2 short beeps : Upper digit matched.
1 short beep : Lower digit matched.

5. Press the MODE selector button.
   The right “0” (lower digit) indication of the malfunction code flashes.
6. Malfunction code lower digit diagnosis
   Press the UP or DOWN button and change the malfunction code lower digit until the continuous malfunction code matching buzzer (*2) is generated.

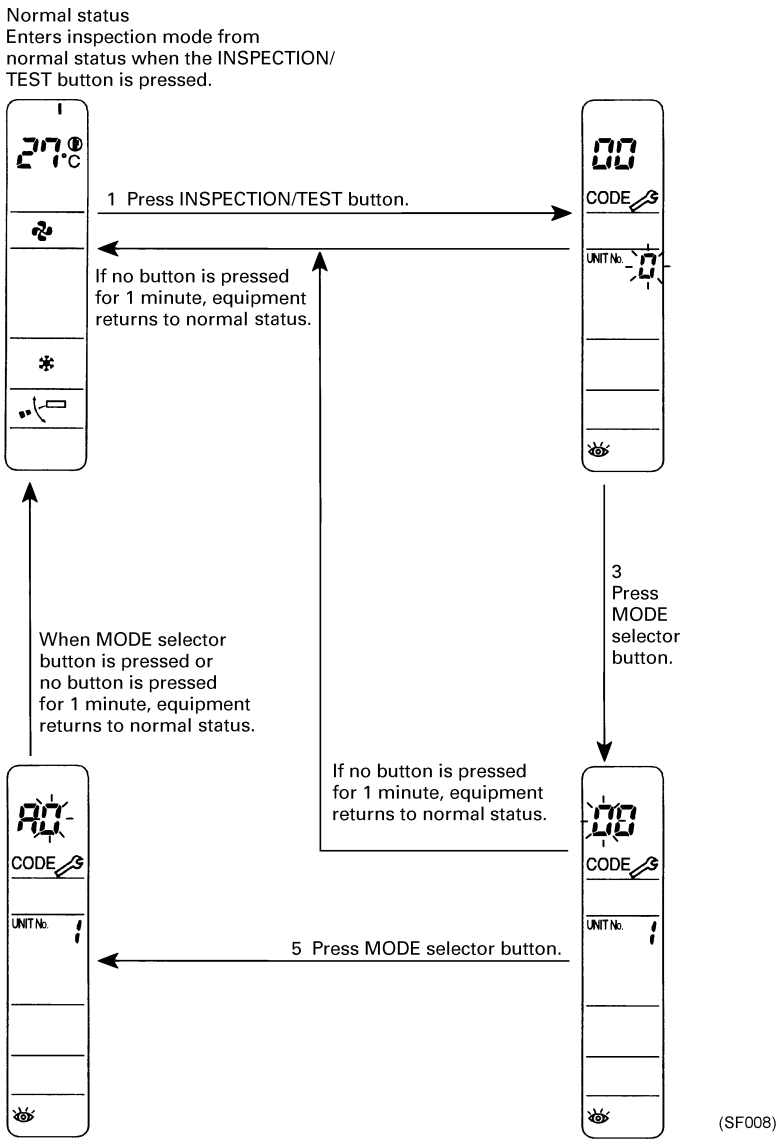
■ The lower digit of the code changes as shown below when the UP and DOWN buttons are pressed.



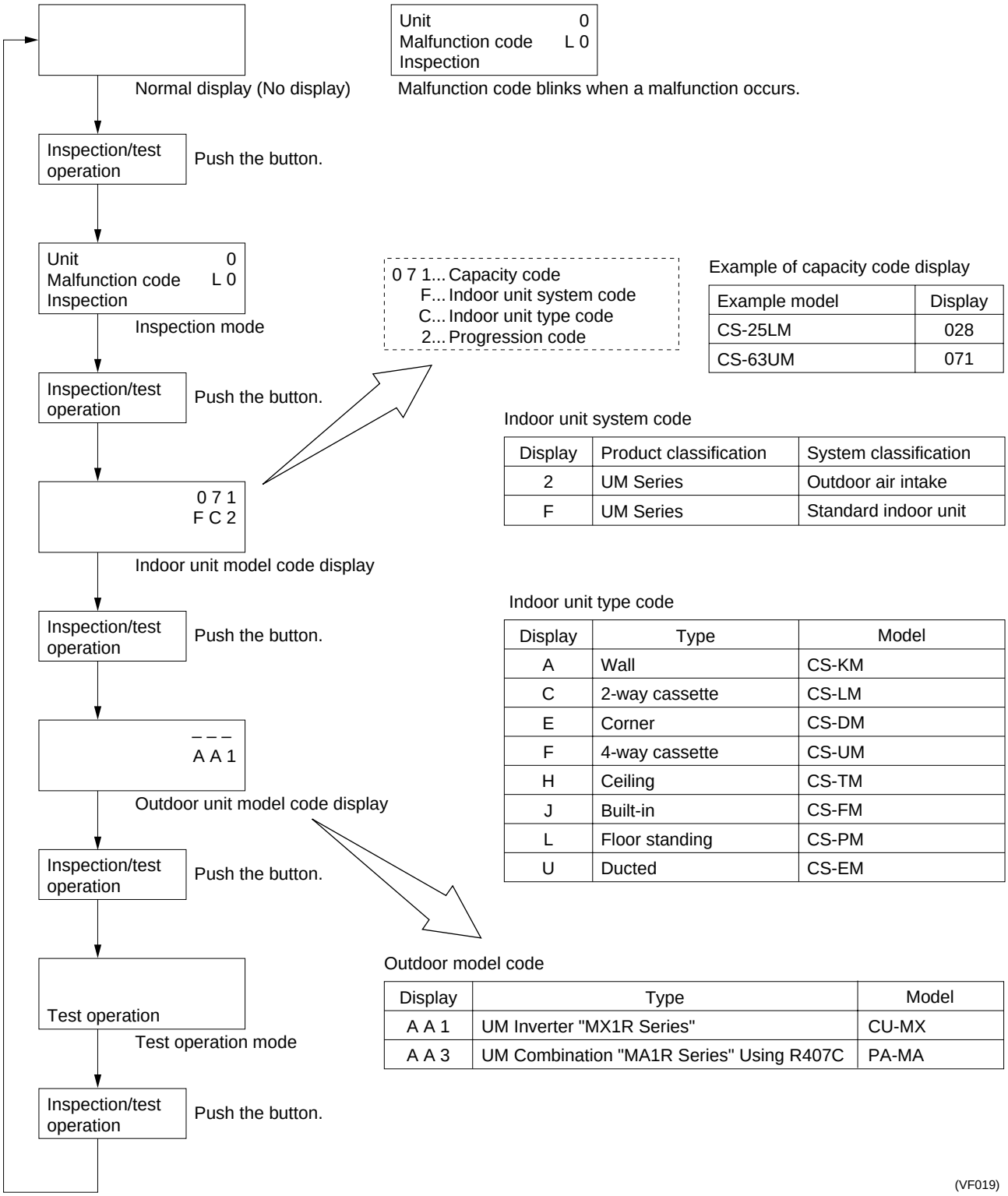
(SE007)



(SL027)

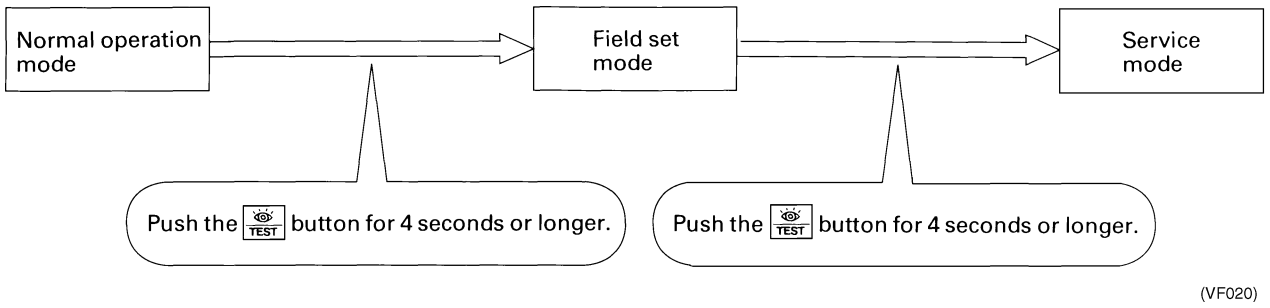

Normal status
Enters inspection mode from
normal status when the INSPECTION/
TEST button is pressed.
27°C
00
CODE
UNIT No.
0
1 Press INSPECTION/TEST button.
If no button is pressed
for 1 minute, equipment
returns to normal status.
3
Press
MODE
selector
button.
When MODE selector
button is pressed or
no button is pressed
for 1 minute, equipment
returns to normal status.
If no button is pressed
for 1 minute, equipment
returns to normal status.
A0
CODE
UNIT No.
1
00
CODE
UNIT No.
1
5 Press MODE selector button.
(SF008)

2.4 Operation of The Remote Controller's Inspection / Test Operation Button


Unit 0
Malfunction code L 0
Inspection
Malfunction code blinks when a malfunction occurs.
Normal display (No display)
Inspection/test operation
Push the button.
Unit 0
Malfunction code L 0
Inspection
Inspection mode
Inspection/test operation
Push the button.
0 7 1 F C 2
Indoor unit model code display
Inspection/test operation
Push the button.
– – – A A 1
Outdoor unit model code display
Inspection/test operation
Push the button.
Test operation
Test operation mode
Inspection/test operation
Push the button.
0 7 1... Capacity code
F... Indoor unit system code
C... Indoor unit type code
2... Progression code
Example of capacity code display
Example model | Display
CS-25LM | 028
CS-63UM | 071
Indoor unit system code
Display | Product classification | System classification
2 | UM Series | Outdoor air intake
F | UM Series | Standard indoor unit
Indoor unit type code
Display | Type | Model
A | Wall | CS-KM
C | 2-way cassette | CS-LM
E | Corner | CS-DM
F | 4-way cassette | CS-UM
H | Ceiling | CS-TM
J | Built-in | CS-FM
L | Floor standing | CS-PM
U | Ducted | CS-EM
Outdoor model code
Display | Type | Model
A A 1 | UM Inverter "MX1R Series" | CU-MX
A A 3 | UM Combination "MA1R Series" Using R407C | PA-MA
(VF019)

2.5 Remote Controller Service Mode

How to Enter the Service Mode


Normal operation mode
Field set mode
Service mode
Push the TEST button for 4 seconds or longer.
Push the TEST button for 4 seconds or longer.

(VF020)

Service Mode Operation Method

1. Select the mode No.
Set the desired mode No. with the button.
(For wireless remote controller, Mode 43 only can be set.)

2. Select the unit No. (For group control only)
Select the indoor unit No. to be set with the time mode . (For wireless remote controller, UP DOWN button.)

3. Make the settings required for each mode. (Modes 41, 44, 45)
In case of Mode 44, 45, push the timer button to be able to change setting before setting work. (LCD “code” blinks.)
For details, refer to the table in next page.

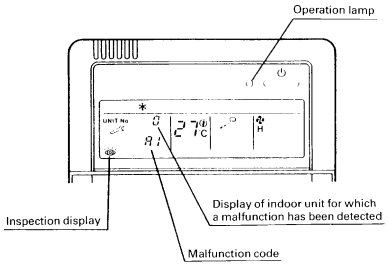
4. Define the setting contents. (Modes 44, 45)
Define by pushing the timer button.
After defining, LCD “code” changes blinking to ON.

5. Return to the normal operation mode.
Push the TEST button one time.

Mode No	Function	Contents and operation method	Remote controller display example
40	Malfunction hysteresis display	Display malfunction hysteresis. The hysteresis No. can be changed with the button.	Unit 1 Malfunction code 40 2-U4 Malfunction code Hysteresis No: 1 - 9 1: Latest (VE007)
41	Display of sensor and address data	Display various types of data. Select the data to be displayed with the button. Sensor data 0: Thermostat sensor in remote controller. 1: Suction 2: Liquid pipe 3: Gas pipe Address data 4: Indoor unit address 5: Outdoor unit address 6: HR box address 7: Zone control address 8: Cool/heat group address 9: Demand / low noise address	Sensor data display Unit No. / Sensor type 1 1 2 7 41 Temperature ºC Address display Unit No. / Address type 1 8 1 41 Address (VE008)
43	Forced fan ON	Manually turn the fan ON by each unit. (When you want to search for the unit No.) By selecting the unit No. with the button, you can turn the fan of each indoor unit on (forced ON) individually.	Unit 1 43 (VE009)
44	Individual setting	Set the fan speed and air flow direction by each unit Select the unit No. with the time mode button. Set the fan speed with the button Set the air flow direction with the button.	Unit 1 Code 44 1 3 Fan speed 1: Low 3: High Air flow direction P0 - P4 (VE010)
45	Unit No. transfer	Transfer unit No. Select the unit No. with the button. Set the unit No. after transfer with the button.	Present unit No. Unit 1 Code 0 2 45 Unit No. after transfer (VE011)
46	This function is not used by UM “MX1R Series”.		
47			

2.6 Remote Controller Self-Diagnosis Function (Display of Malfunction Code)

The remote controller switches are equipped with a self diagnosis function so that more appropriate maintenance can be carried out. If a malfunction occurs during operation, the operation lamp, malfunction code and display of malfunctioning unit No. let you know the contents and location of the malfunction. When there is a stop due to malfunction, the contents of the malfunction given below can be diagnosed by a combination of operation lamp, INSPECTION display of the liquid crystal display and display of malfunction code. It also lets you know the unit No. during group control.



(VL050)

Malfunction Code List

	Malfunction code	Operation lamp	Inspection display	Unit No.	Malfunction contents	Page Refered
Indoor Unit	A0	◑	◑	◑	Error of external protection device	498
	A1	◑	◑	◑	PC board defect	499
	A1	○	●	◑	PC board defect	499
	A3	◑	◑	◑	Malfunction of drain level control system (33H)	500
	A6	◑	◑	◑	Fan motor (M1F) lock, Overload	501
	A7	○	●	◑	Malfunction of swing flap motor (M1S)	502
	A9	◑	◑	◑	Malfunction of moving part of electronic expansion valve (Y1E)	503
	AF	○	●	◑	Drain level above limit	504
	AH	◑	◑	◑	Malfunction of air filter maintenance	—
	AJ	◑	◑	◑	Malfunction of capacity determination device	505
	C4	◑	◑	◑	Malfunction of thermistor (R2T) for liquid pipe (loose connection, disconnection, short circuit, failure)	506
	C5	◑	◑	◑	Malfunction of thermistor (R3T) for gas pipes (loose connection, disconnection, short circuit, failure)	507
	C9	◑	◑	◑	Malfunction of thermistor (R1T) for air inlet (loose connection, disconnection, short circuit, failure)	508
	CJ	○	○	○	Malfunction of thermostat sensor in remote controller	509
Outdoor Unit	E0	◑	◑	◑	Actuation of safety device	510
	E1	◑	◑	◑	PC board defect	511
	E1	○	●	◑	PC board defect	511
	E3	◑	◑	◑	Actuation of high pressure switch	512
	E4	◑	◑	◑	Actuation of low pressure switch	513
	E9	◑	◑	◑	Malfunction of moving part of electronic expansion valve (Y1E)	514
	F3	◑	◑	◑	Abnormal discharge pipe temperature	515
	H3	○	●	◑	High pressure switch failure	—
	H4	◑	◑	◑	Actuation of low pressure switch	—
	H9	◑	◑	◑	Malfunction of thermistor (R1T) for outdoor air (loose connection, disconnection, short circuit, failure)	516
	H9	○	●	◑	Malfunction of thermistor (R1T) for outdoor air (loose connection, disconnection, short circuit, failure)	516
	J1	◑	◑	◑	Malfunction of pressure sensor	—
	J3	◑	◑	◑	Malfunction of discharge pipe thermistor (R3T) (loose connection, disconnection, short circuit, failure)	517
	J3	○	●	◑	Malfunction of discharge pipe thermistor (R3T) (loose connection, disconnection, short circuit, failure)	517
	J5	◑	◑	◑	Malfunction of thermistor (R4T) for suction pipe (loose connection, disconnection, short circuit, failure)	518

	Malfunction code	Operation lamp	Inspection display	Unit No.	Malfunction contents	Page Refered
Outdoor Unit	J6	◑	◑	◑	Malfunction of thermistor (R2T) for heat exchanger (loose connection, disconnection, short circuit, failure)	519
	J6	○	●	◑	Malfunction of thermistor (R2T) for heat exchanger (loose connection, disconnection, short circuit, failure)	519
	JA	◑	◑	◑	Malfunction of discharge pipe pressure sensor	520
	JC	◑	◑	◑	Malfunction of suction pipe pressure sensor	521
	JH	○	●	◑	Malfunction of oil temperature thermistor (R5T)	—
	L0	◑	◑	◑	Failure of inverter system	—
	L4	◑	◑	◑	Malfunction of inverter radiating fin temperature rise	535
	L5	◑	◑	◑	Inverter instantaneous over-current	536
	L6	◑	◑	◑	Compressor motor insulation defect, short circuit	—
	L8	◑	◑	◑	Inverter thermostat sensor, Compressor overload	537
	L9	◑	◑	◑	Inverter stall prevention, Compressor lock	538
	LA	◑	◑	◑	Malfunction of power unit	—
	LC	◑	◑	◑	Malfunction of transmission between inverter and control PC board	539
System	P0	◑	●	◑	Gas depletion (heat build up)	—
	P1	◑	◑	◑	Inverter over-ripple protection	541
	P4	◑	◑	◑	Malfunction of inverter radiating fin temperature rise sensor	542
	U0	○	●	◑	Low pressure drop due to refrigerant shortage or electronic expansion valve failure	522
	U1	◑	◑	◑	Negative phase / open phase	523
	U2	◑	◑	◑	Power supply insufficient or instantaneous failure	540
	U4	◑	◑	◑	Malfunction of transmission between indoor units	524
	U5	◑	◑	◑	Malfunction of transmission between remote controller and indoor unit	525
	U5	●	○	●	Failure of remote controller PC board or setting during control by remote controller	—
	U7	◑	◑	◑	Malfunction of transmission between indoor units Malfunction of transmission between outdoor units, malfunction of transmission between outdoor unit and ice build-up heat unit	—
	U7	○	●	◑	Malfunction of transmission between outdoor units (cool/ heat unified, low noise)	526
	U8	◑	◑	●	Malfunction of transmission between master and slave remote controllers (malfunction of slave remote controller)	527
	U9	◑	◑	◑	Malfunction of transmission between indoor and outdoor units in the same system	528
	UA	◑	◑	◑	Excessive number of indoor units	529
	UC	○	○	○	Address duplication of central remote controller	530
	UE	◑	◑	◑	Malfunction of transmission between central remote controller and indoor unit	543
	UF	◑	◑	◑	Refrigerant system not set, incompatible wiring / piping	531
	UH	◑	◑	◑	Malfunction of system, refrigerant system address undefined	532
Centralized Control and Schedule Timer	UE	◑	◑	◑	Malfunction of transmission between central remote controller and indoor unit	543 548
	M1	○ or ◑	◑	◑	PC board defect	544 549
	M8	○ or ◑	◑	◑	Malfunction of transmission between optional controllers for centralised control	545 550
	MA	○ or ◑	◑	◑	Improper combination of optional controllers for centralised control	546 551
	MC	○ or ◑	◑	◑	Address duplication, improper setting	547 552

In case of the malfunction with the shaded error code, the unit still operates. However, be sure to have it inspected and repaired and as soon as possible.

3. Troubleshooting

3.1 Indoor Unit: Error of External Protection Device

Remote Controller Display

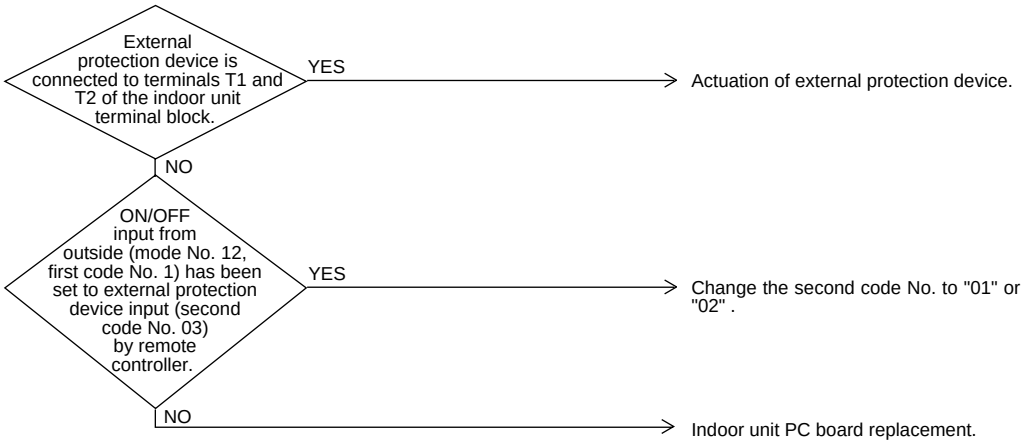
A0

Supposed Causes

- Actuation of external protection device
- Improper field set
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


External protection device is connected to terminals T1 and T2 of the indoor unit terminal block.
YES
Actuation of external protection device.
NO
ON/OFF input from outside (mode No. 12, first code No. 1) has been set to external protection device input (second code No. 03) by remote controller.
YES
Change the second code No. to "01" or "02" .
NO
Indoor unit PC board replacement.

(VF029)

3.2 Indoor Unit: PC Board Defect

Remote Controller Display

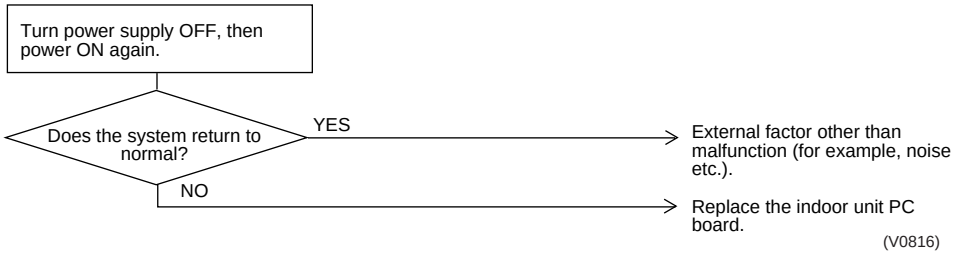
A1

Supposed Causes

- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Turn power supply OFF, then power ON again.
Does the system return to normal?
YES
External factor other than malfunction (for example, noise etc.).
NO
Replace the indoor unit PC board.
(V0816)

3.3 Indoor Unit: Malfunction of Drain Level Control System (33H)

Remote Controller Display

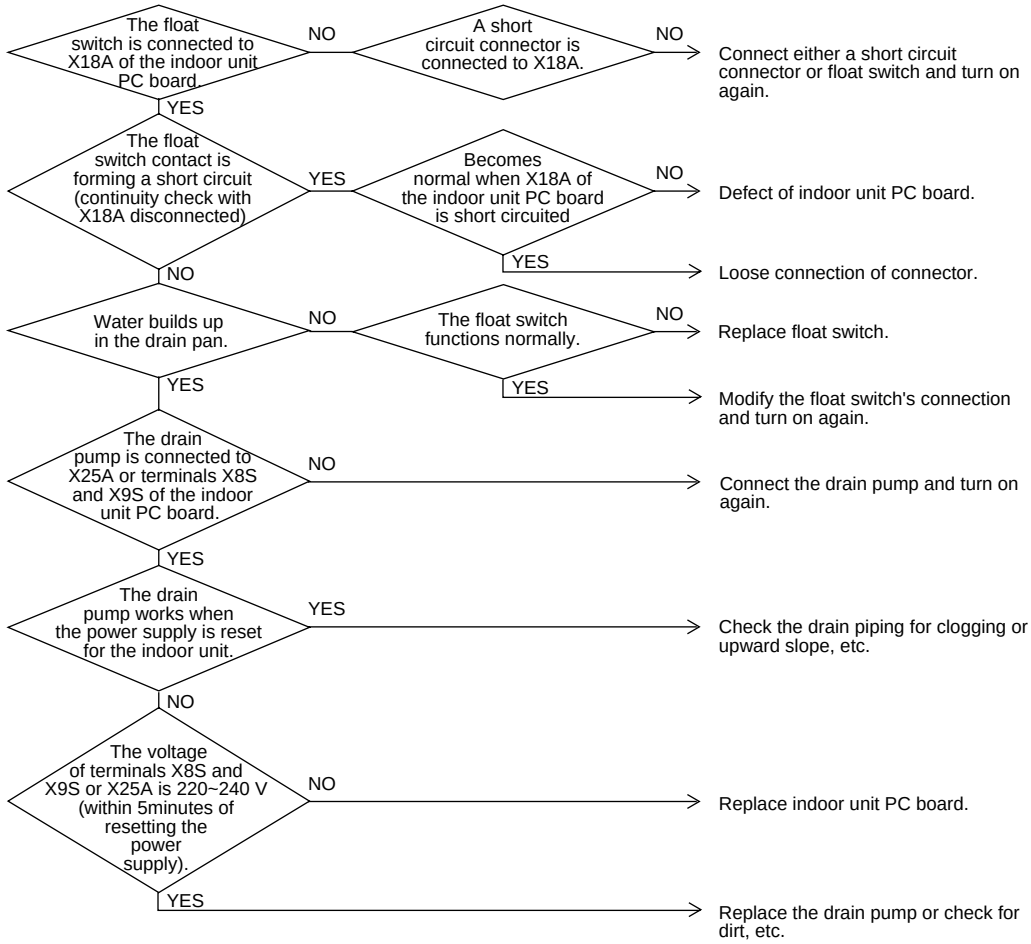
A3

Supposed Causes

- Defect of float switch or short circuit connector
- Defect of drain pump
- Drain clogging, upward slope, etc.
- Defect of indoor unit PC board
- Loose connection of connector

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The float switch is connected to X18A of the indoor unit PC board.
NO
A short circuit connector is connected to X18A.
NO
Connect either a short circuit connector or float switch and turn on again.
YES
The float switch contact is forming a short circuit (continuity check with X18A disconnected)
YES
Becomes normal when X18A of the indoor unit PC board is short circuited
NO
Defect of indoor unit PC board.
YES
Loose connection of connector.
NO
Water builds up in the drain pan.
NO
The float switch functions normally.
NO
Replace float switch.
YES
YES
Modify the float switch's connection and turn on again.
The drain pump is connected to X25A or terminals X8S and X9S of the indoor unit PC board.
NO
Connect the drain pump and turn on again.
YES
The drain pump works when the power supply is reset for the indoor unit.
YES
Check the drain piping for clogging or upward slope, etc.
NO
The voltage of terminals X8S and X9S or X25A is 220~240 V (within 5minutes of resetting the power supply).
NO
Replace indoor unit PC board.
YES
Replace the drain pump or check for dirt, etc.

(VF030)

3.4 Indoor Unit: Fan Motor (M1F) Lock, Overload

Remote Controller Display

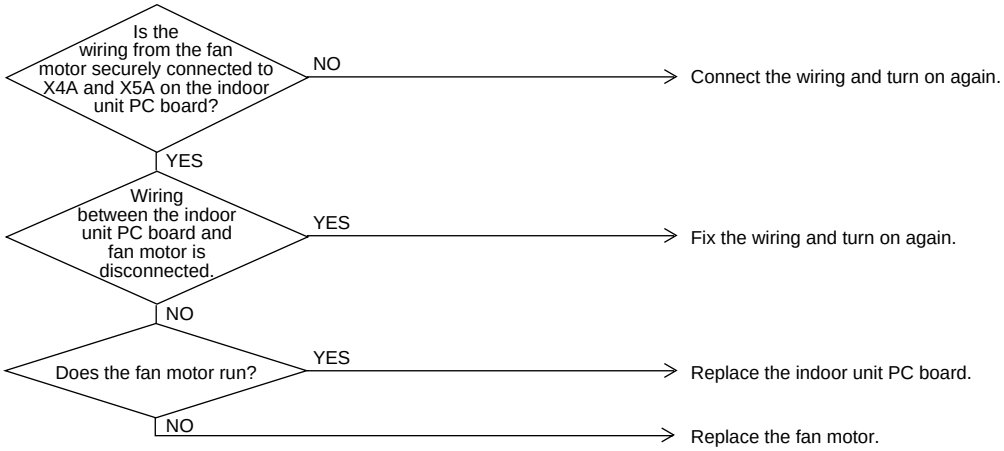
A6

Supposed Causes

- Fan motor lock
- Disconnected or faulty wiring between fan motor and PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is the wiring from the fan motor securely connected to X4A and X5A on the indoor unit PC board?
NO
Connect the wiring and turn on again.
YES
Wiring between the indoor unit PC board and fan motor is disconnected.
YES
Fix the wiring and turn on again.
NO
Does the fan motor run?
YES
Replace the indoor unit PC board.
NO
Replace the fan motor.

(VF031)

3.5 Indoor Unit: Malfunction of Swing Flap Motor (M1S)

Remote Controller Display

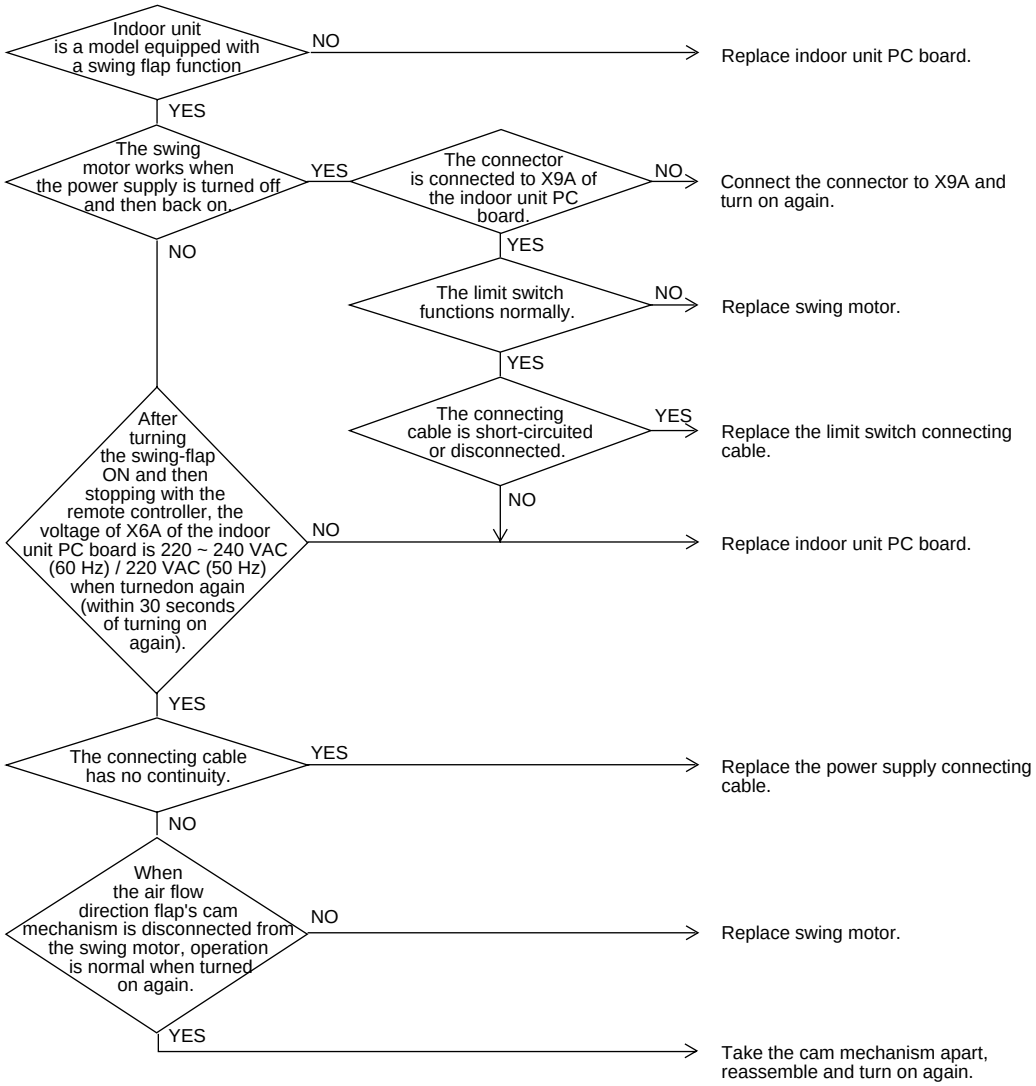
A7

Supposed Causes

- Defect of swing motor
- Defect of connection cable (power supply and limit switch)
- Defect of air flow direction adjusting flap-cam
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Indoor unit is a model equipped with a swing flap function
NO
Replace indoor unit PC board.
YES
The swing motor works when the power supply is turned off and then back on.
YES
The connector is connected to X9A of the indoor unit PC board.
NO
Connect the connector to X9A and turn on again.
YES
NO
The limit switch functions normally.
NO
Replace swing motor.
YES
The connecting cable is short-circuited or disconnected.
YES
Replace the limit switch connecting cable.
NO
After turning the swing-flap ON and then stopping with the remote controller, the voltage of X6A of the indoor unit PC board is 220 ~ 240 VAC (60 Hz) / 220 VAC (50 Hz) when turnedon again (within 30 seconds of turning on again).
NO
Replace indoor unit PC board.
YES
The connecting cable has no continuity.
YES
Replace the power supply connecting cable.
NO
When the air flow direction flap's cam mechanism is disconnected from the swing motor, operation is normal when turned on again.
NO
Replace swing motor.
YES
Take the cam mechanism apart, reassemble and turn on again.

(VF032)

3.6 Indoor Unit: Malfunction of Moving Part of Electronic Expansion Valve (Y1E)

Remote Controller Display

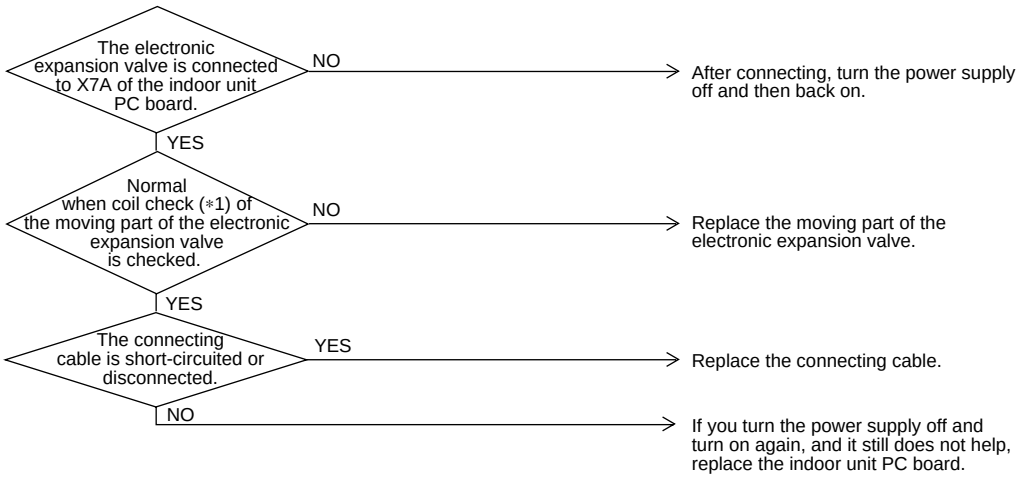
A9

Supposed Causes

- Malfunction of moving part of electronic expansion valve
- Defect of indoor unit PC board
- Defect of connecting cable

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The electronic expansion valve is connected to X7A of the indoor unit PC board.
NO
After connecting, turn the power supply off and then back on.
YES
Normal when coil check (*1) of the moving part of the electronic expansion valve is checked.
NO
Replace the moving part of the electronic expansion valve.
YES
The connecting cable is short-circuited or disconnected.
YES
Replace the connecting cable.
NO
If you turn the power supply off and turn on again, and it still does not help, replace the indoor unit PC board.

(VF033)

*1: Coil check method for the moving part of the electronic expansion valve.
Discount the electronic expansion valve from the PC board and check the continuity between the connector pins.

(Normal)

Pin No.	1. White	2. Yellow	3. Orange	4. Blue	5. Red	6. Brown
1. White		×	○ Approx. 300Ω	×	○ Approx. 150Ω	×
2. Yellow			×	○ Approx. 300Ω	×	○ Approx. 150Ω
3. Orange				×	○ Approx. 150Ω	×
4. Blue					×	○ Approx. 150Ω
5. Red						×
6. Brown						

○: Continuity
×: No continuity

3.7 Indoor Unit: Drain Level above Limit

Remote Controller Display

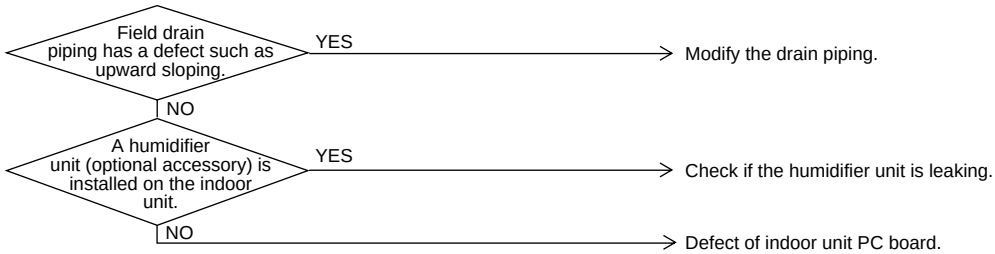
AF

Supposed Causes

- Humidifier unit (optional accessory) leaking
- Defect of drain pipe (upward slope, etc.)
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Field drain piping has a defect such as upward sloping.
YES
Modify the drain piping.
NO
A humidifier unit (optional accessory) is installed on the indoor unit.
YES
Check if the humidifier unit is leaking.
NO
Defect of indoor unit PC board.

(VF034)

3.8 Indoor Unit: Malfunction of Capacity Determination Device

Remote controller display

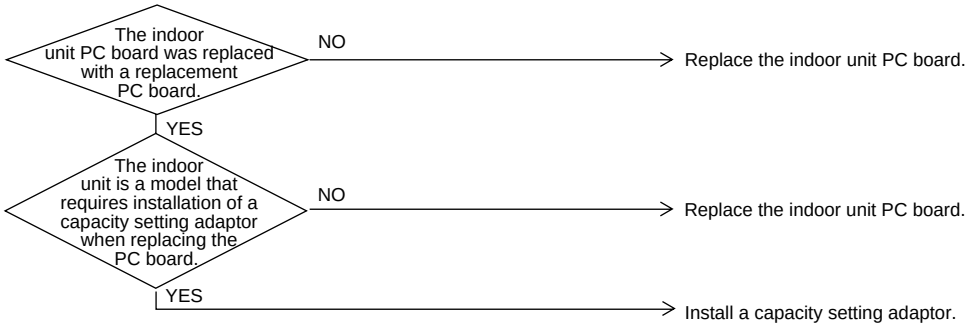
AJ

Supposed Causes

- You have forgotten to install the capacity setting adaptor.
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The indoor unit PC board was replaced with a replacement PC board.
NO
Replace the indoor unit PC board.
YES
The indoor unit is a model that requires installation of a capacity setting adaptor when replacing the PC board.
NO
Replace the indoor unit PC board.
YES
Install a capacity setting adaptor.

(VF035)

3.9 Indoor Unit: Malfunction of Thermistor (R2T) for Liquid Pipe

Remote Controller Display

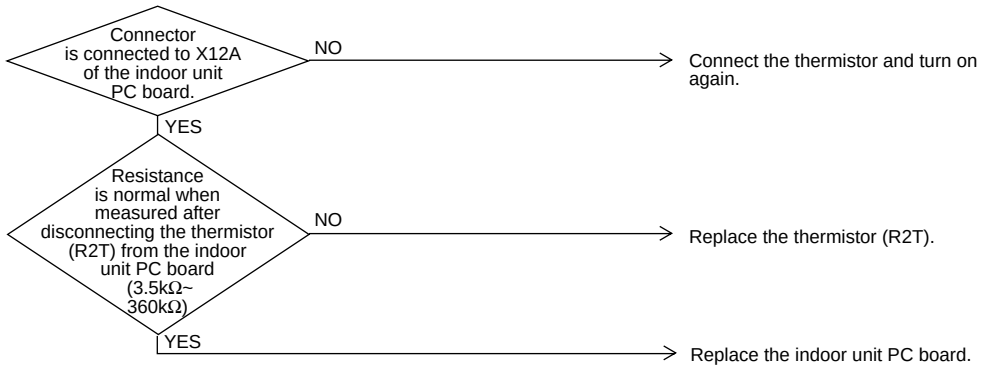
C4

Supposed Causes

- Defect of thermistor (R2T) for liquid pipe
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X12A of the indoor unit PC board.
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R2T) from the indoor unit PC board (3.5kΩ~ 360kΩ)
NO
Replace the thermistor (R2T).
YES
Replace the indoor unit PC board.

(VF036)

3.10 Indoor Unit: Malfunction of Thermistor (R3T) for Gas Pipes

Remote Controller Display

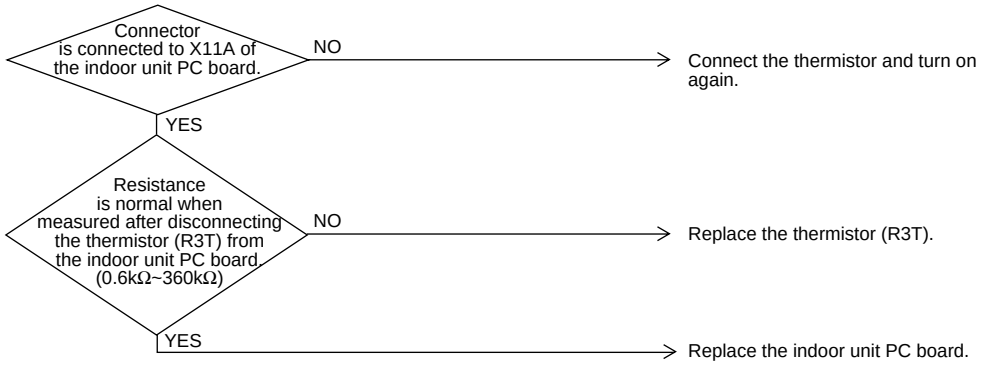
C5

Supposed Causes

- Defect of indoor unit thermistor (R3T) for gas pipe
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X11A of the indoor unit PC board.
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R3T) from the indoor unit PC board. (0.6kΩ~360kΩ)
NO
Replace the thermistor (R3T).
YES
Replace the indoor unit PC board.

(VF037)

3.11 Indoor Unit: Malfunction of Thermistor (R1T) for Air Inlet

Remote Controller Display

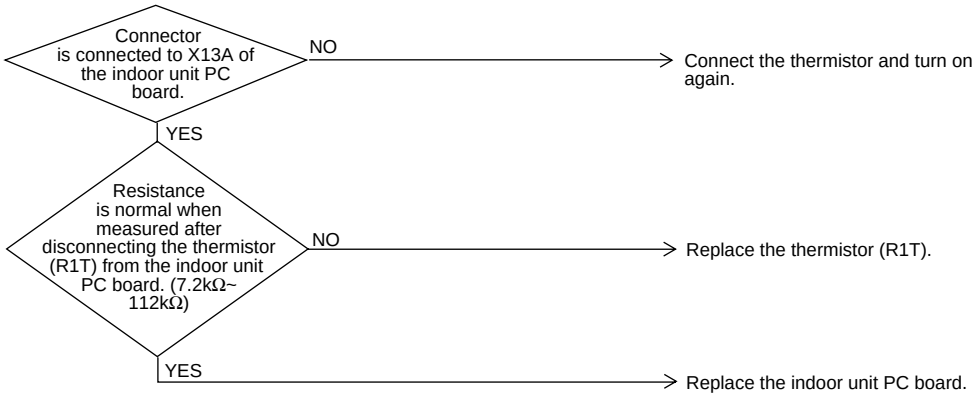
C9

Supposed Causes

- Defect of indoor unit thermistor (R1T) for air inlet
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X13A of the indoor unit PC board.
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R1T) from the indoor unit PC board. (7.2kΩ~ 112kΩ)
NO
Replace the thermistor (R1T).
YES
Replace the indoor unit PC board.

(VF038)

3.12 Indoor Unit: Malfunction of Thermostat Sensor in Remote Controller

Remote Controller Display

CJ

Supposed Causes

- Defect of remote controller thermistor
- Defect of remote controller PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

Turn power supply OFF, then power ON again.
Is "CJ" displayed on the remote controller?
YES
Replace remote controller.
NO
External factor other than equipment malfunction. (for example, noise etc.)
(VF039)

3.13 Outdoor Unit: Actuation of Safety Device

Remote Controller Display

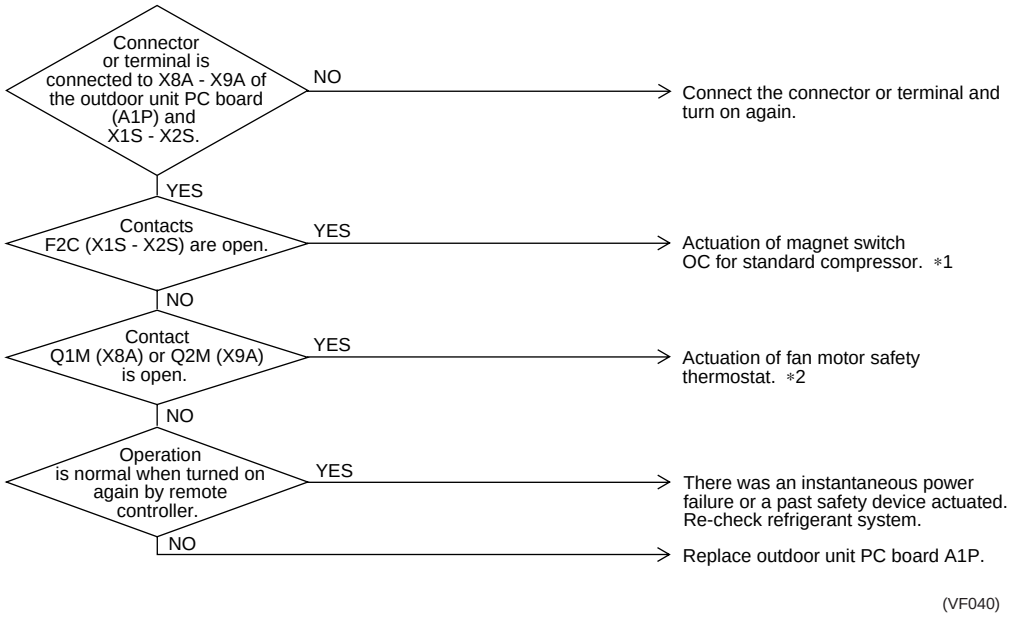
E0

Supposed Causes

- Actuation of outdoor unit safety device
- Defect of outdoor unit PC board
- Instantaneous power failure

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector or terminal is connected to X8A - X9A of the outdoor unit PC board (A1P) and X1S - X2S.
NO
Connect the connector or terminal and turn on again.
YES
Contacts F2C (X1S - X2S) are open.
YES
Actuation of magnet switch OC for standard compressor. ∗1
NO
Contact Q1M (X8A) or Q2M (X9A) is open.
YES
Actuation of fan motor safety thermostat. ∗2
NO
Operation is normal when turned on again by remote controller.
YES
There was an instantaneous power failure or a past safety device actuated. Re-check refrigerant system.
NO
Replace outdoor unit PC board A1P.

(VF040)

∗1: Actuation of magnet switch OC
Defect of compressor
Power supply insufficient
Defect of magnet switch, etc.

∗2: Actuation of fan motor safety thermostat
Defect of fan motor
Defect of capacitor, etc.

3.14 Outdoor Unit: PC Board Defect

Remote Controller Display	E1
Supposed Causes	■ Defect of outdoor unit PC board (A1P)
Troubleshooting	Replace outdoor unit PC board A1P.

3.15 Outdoor Unit: Actuation of High Pressure Switch

Remote Controller Display

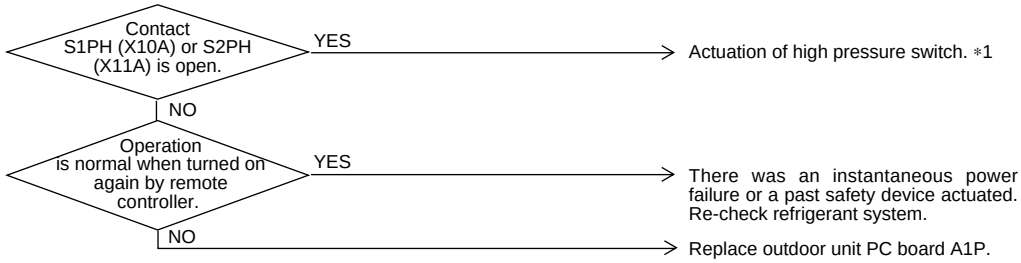
E3

Supposed Causes

- Actuation of outdoor unit high pressure switch
- Defect of outdoor unit PC board (A1P)
- Instantaneous power failure

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Contact S1PH (X10A) or S2PH (X11A) is open.
YES
Actuation of high pressure switch. ∗1
NO
Operation is normal when turned on again by remote controller.
YES
There was an instantaneous power failure or a past safety device actuated. Re-check refrigerant system.
NO
Replace outdoor unit PC board A1P.

(VF041)

∗1: Actuation of high pressure switch (HPS)
The outdoor unit PC board's connector is disconnected.
Is the outdoor unit heat exchanger dirty?
Defect of outdoor fan
Is the refrigerant over-charged?

3.16 Outdoor Unit: Actuation of Low Pressure Switch

Remote Controller Display

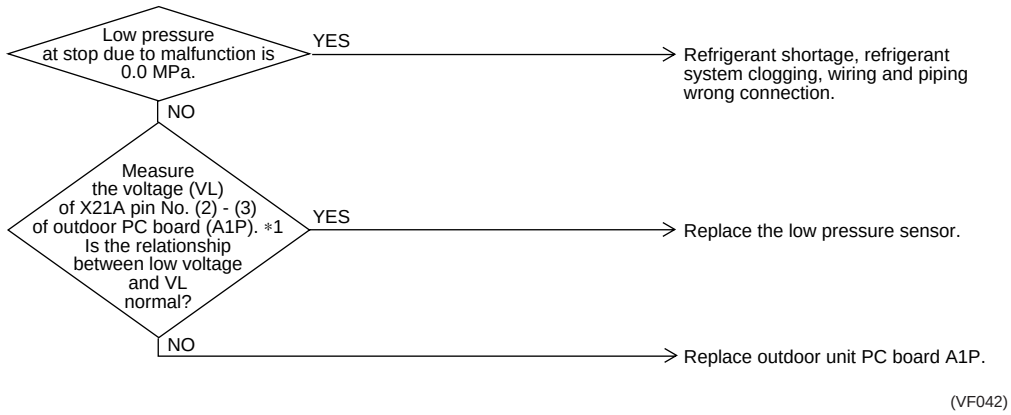
E4

Supposed Causes

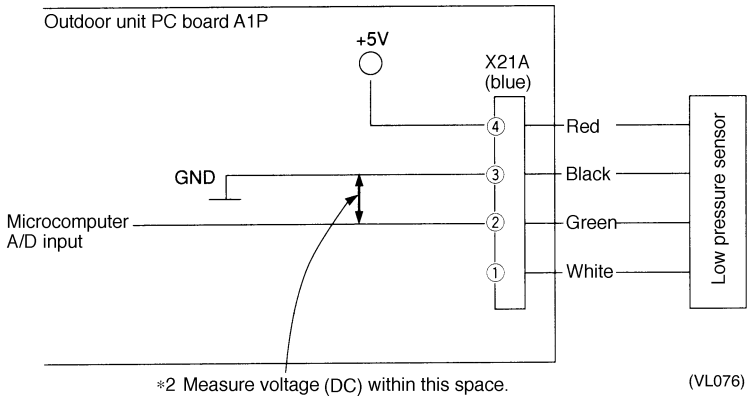
- Abnormal drop of low pressure (0 kg/cm² [0 MPa])
- Defect of low pressure sensor
- Defect of outdoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Low pressure at stop due to malfunction is 0.0 MPa.
YES
Refrigerant shortage, refrigerant system clogging, wiring and piping wrong connection.
NO
Measure the voltage (VL) of X21A pin No. (2) - (3) of outdoor PC board (A1P). ∗1 Is the relationship between low voltage and VL normal?
YES
Replace the low pressure sensor.
NO
Replace outdoor unit PC board A1P.
(VF042)

∗1: Voltage measurement point



∗2: Refer to pressure sensor, pressure / voltage characteristics table on P587.

3.17 Outdoor Unit: Malfunction of Moving Part of Electronic Expansion Valve (Y1E)

Remote Controller Display

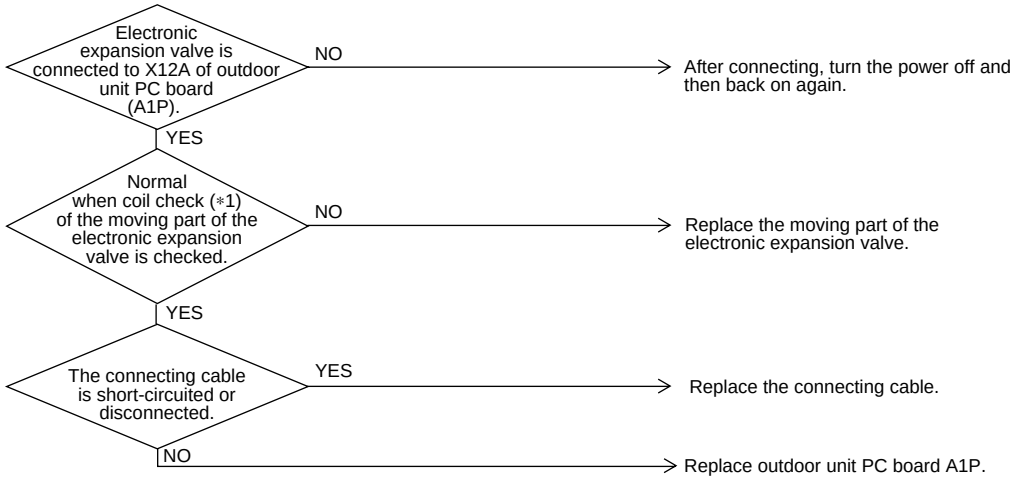
E9

Supposed Causes

- Defect of moving part of electronic expansion valve
- Defect of outdoor unit PC board (A1P)
- Defect of connecting cable

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Electronic expansion valve is connected to X12A of outdoor unit PC board (A1P).
NO
After connecting, turn the power off and then back on again.
YES
Normal when coil check (∗1) of the moving part of the electronic expansion valve is checked.
NO
Replace the moving part of the electronic expansion valve.
YES
The connecting cable is short-circuited or disconnected.
YES
Replace the connecting cable.
NO
Replace outdoor unit PC board A1P.
(VF043)

∗1 Coil check method for the moving part of the electronic expansion valve
Disconnect the electronic expansion valve from the PC board and check the continuity between the connector pins.

(Normal)

Pin No.	1. White	2. Yellow	3. Orange	4. Blue	5. Red	6. Brown
1. White		×	◎	×	○	×
2. Yellow			×	◎	×	○
3. Orange				×	○	×
4. Blue					×	○
5. Red						×
6. Brown						

◎: Continuity Approx. 300Ω
○: Continuity Approx. 150Ω
×: No continuity

3.18 Outdoor Unit: Abnormal Discharge Pipe Temperature

Remote Controller Display

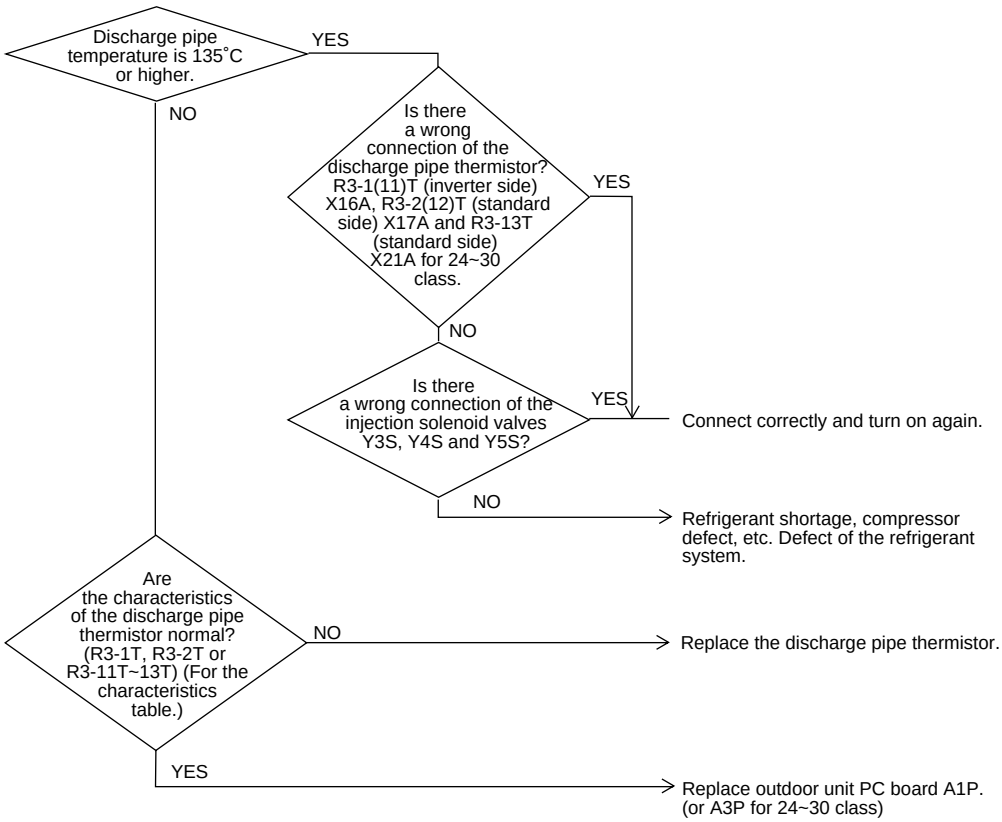
F3

Supposed Causes

- Abnormal discharge pipe temperature
- Defect of discharge pipe thermistor (CU-5: R3T CU-8, 10: R3-1T, R3-2T)
- Defect of outdoor unit PC board
- Discharge pipe thermistor wrong connection
- Liquid injection solenoid valve wrong connection

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Discharge pipe temperature is 135˚C or higher.
YES
NO
Is there a wrong connection of the discharge pipe thermistor? R3-1(11)T (inverter side) X16A, R3-2(12)T (standard side) X17A and R3-13T (standard side) X21A for 24~30 class.
YES
NO
Is there a wrong connection of the injection solenoid valves Y3S, Y4S and Y5S?
YES
Connect correctly and turn on again.
NO
Refrigerant shortage, compressor defect, etc. Defect of the refrigerant system.
Are the characteristics of the discharge pipe thermistor normal? (R3-1T, R3-2T or R3-11T~13T) (For the characteristics table.)
NO
Replace the discharge pipe thermistor.
YES
Replace outdoor unit PC board A1P. (or A3P for 24~30 class)

(VF044)

3.19 Outdoor Unit: Malfunction of Thermistor (R1T) for Outdoor Air

Remote Controller Display

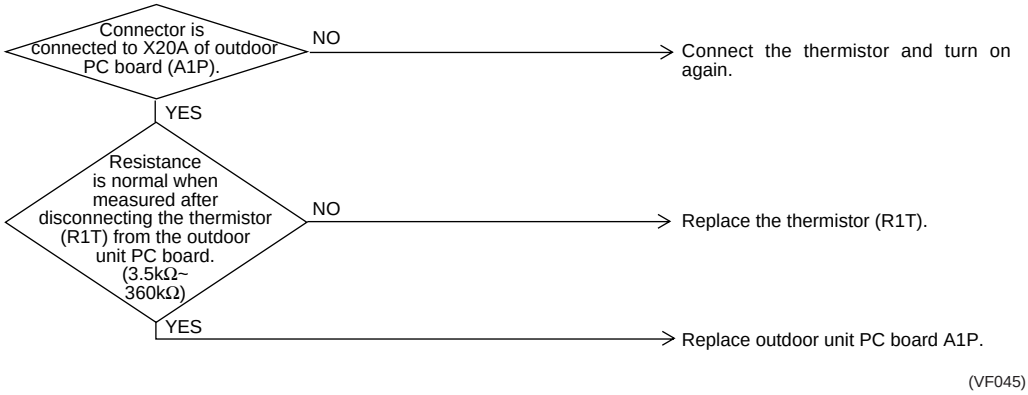
H9

Supposed Causes

- Defect of thermistor (R1T) for outdoor air
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X20A of outdoor PC board (A1P).
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R1T) from the outdoor unit PC board. (3.5kΩ~ 360kΩ)
NO
Replace the thermistor (R1T).
YES
Replace outdoor unit PC board A1P.

(VF045)

The alarm indicator is displayed when the fan only is being used also.

3.20 Outdoor Unit: Malfunction of Discharge Pipe Thermistor (R3T)

Remote Controller Display

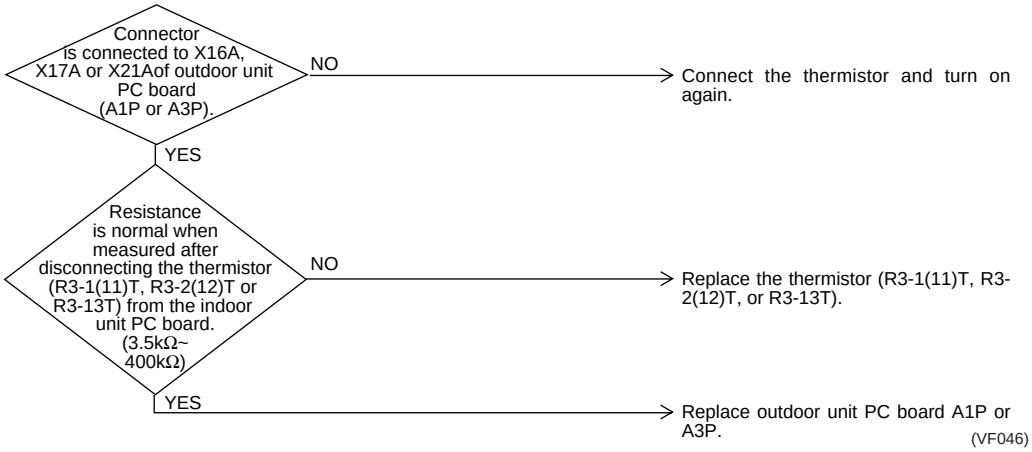
J3

Supposed Causes

- Defect of thermistor (R3-1(11)T, R3-2(12)T or R3-13T) for outdoor unit discharge pipe
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X16A, X17A or X21Aof outdoor unit PC board (A1P or A3P).
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R3-1(11)T, R3-2(12)T or R3-13T) from the indoor unit PC board. (3.5kΩ~ 400kΩ)
NO
Replace the thermistor (R3-1(11)T, R3-2(12)T, or R3-13T).
YES
Replace outdoor unit PC board A1P or A3P.
(VF046)

The alarm indicator is displayed when the fan is being used also.

Note: 16~20 HP class ··· R3-1T, R3-2T (A1P)
24~30 HP class ··· R3-11T, R3-12T (A1P), R3-13T (A3P)

3.21 Outdoor Unit: Malfunction of Thermistor (R4T) for Suction Pipe

Remote Controller Display

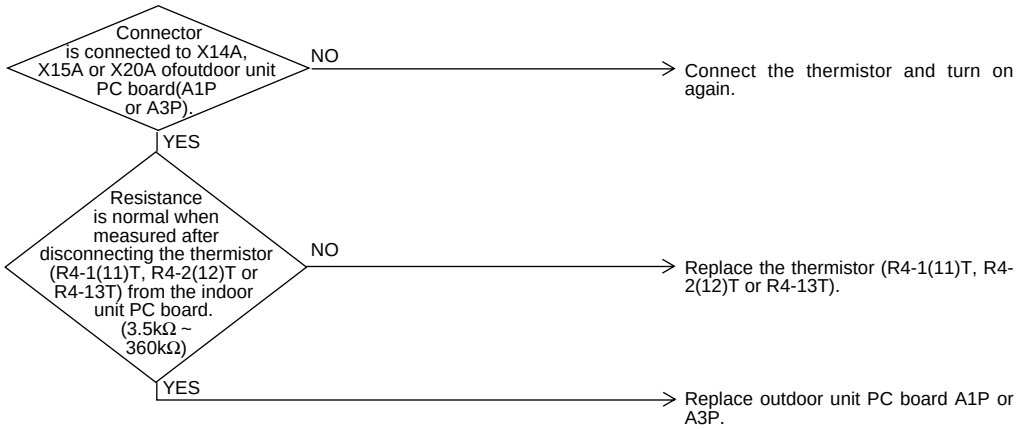
J5

Supposed Causes

- Defect of thermistor (R4-1(11)T, R4-2(12)T or R4-13T) for outdoor unit suction pipe
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X14A, X15A or X20A ofoutdoor unit PC board(A1P or A3P).
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R4-1(11)T, R4-2(12)T or R4-13T) from the indoor unit PC board. (3.5kΩ ~ 360kΩ)
NO
Replace the thermistor (R4-1(11)T, R4-2(12)T or R4-13T).
YES
Replace outdoor unit PC board A1P or A3P.
(VF047)

The alarm indicator is displayed when the fan is being used also.

Note: 16~20HP class ··· R4-1T, R4-2T (A1P)
24~30HP class ··· R4-11T, R4-12T (A1P), R4-13T (A3P)

3.22 Outdoor Unit: Malfunction of Thermistor (R2T) for Heat Exchanger

Remote Controller Display

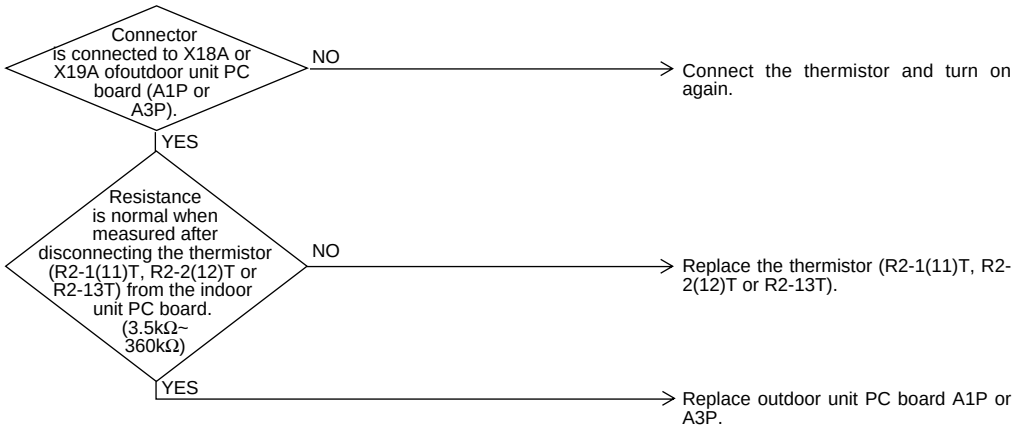
J6

Supposed Causes

- Defect of thermistor (R2-1(11)T, R2-2(12)T or R2-13T) for outdoor unit coil
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Connector is connected to X18A or X19A ofoutdoor unit PC board (A1P or A3P).
NO
Connect the thermistor and turn on again.
YES
Resistance is normal when measured after disconnecting the thermistor (R2-1(11)T, R2-2(12)T or R2-13T) from the indoor unit PC board. (3.5kΩ~ 360kΩ)
NO
Replace the thermistor (R2-1(11)T, R2-2(12)T or R2-13T).
YES
Replace outdoor unit PC board A1P or A3P.

(VF048)

The alarm indicator is displayed when the fan is being used also.

Note: 16~20HP class ··· R2-1T, R2-2T (A1P)
24~30HP class ··· R2-11T, R2-12T (A1P), R2-13T (A3P)

3.23 Outdoor Unit: Malfunction of Discharge Pipe Pressure Sensor

Remote Controller Display

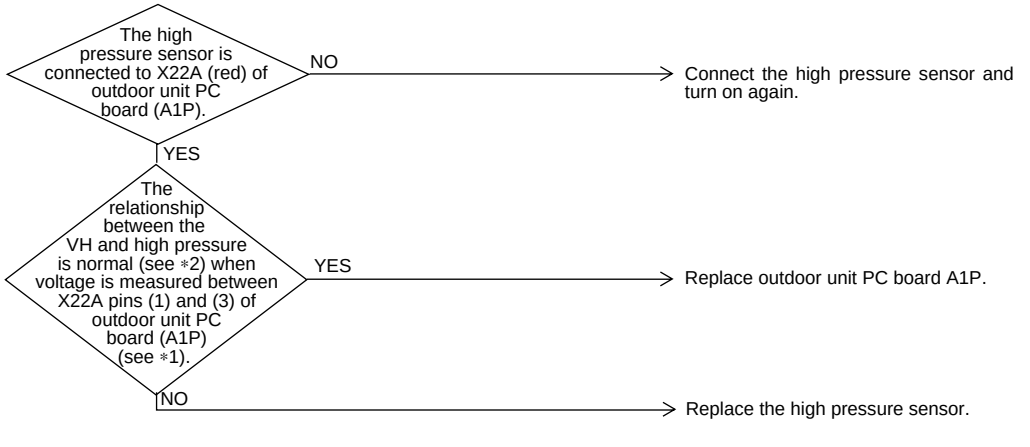
JA

Supposed Causes

- Defect of high pressure sensor system
- Connection of low pressure sensor with wrong connection.
- Defect of outdoor unit PC board.

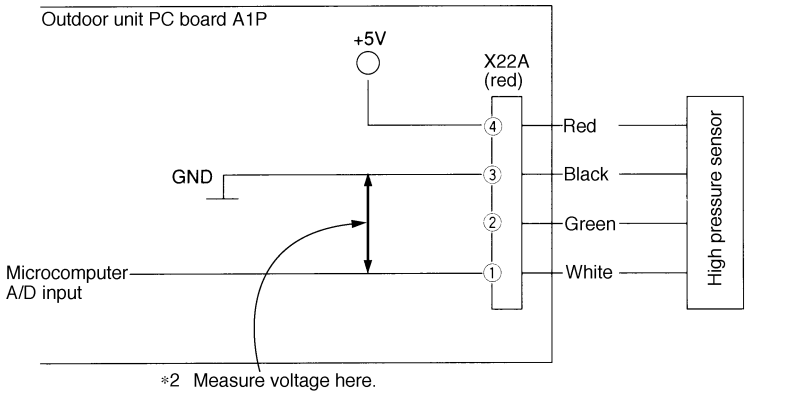
Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The high pressure sensor is connected to X22A (red) of outdoor unit PC board (A1P).
NO
Connect the high pressure sensor and turn on again.
YES
The relationship between the VH and high pressure is normal (see ∗2) when voltage is measured between X22A pins (1) and (3) of outdoor unit PC board (A1P) (see ∗1).
YES
Replace outdoor unit PC board A1P.
NO
Replace the high pressure sensor.

(VF049)

∗1: Voltage measurement point



(VL077)

∗2: Refer to pressure sensor, pressure / voltage characteristics table on P587.

3.24 Outdoor Unit: Malfunction of Suction Pipe Pressure Sensor

Remote Controller Display

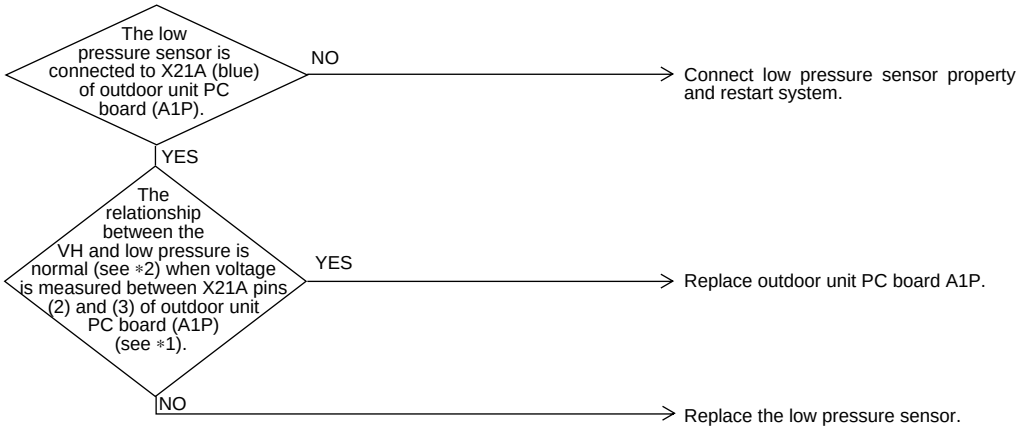
JC

Supposed Causes

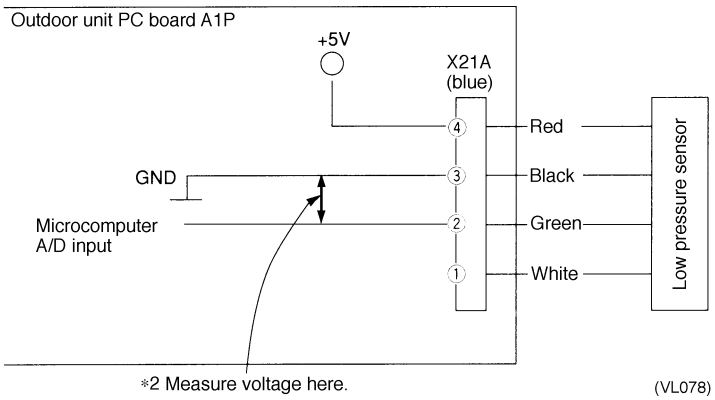
- Defect of low pressure sensor system
- Connection of high pressure sensor with wrong connection.
- Defect of outdoor unit PC board.

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The low pressure sensor is connected to X21A (blue) of outdoor unit PC board (A1P).
NO
Connect low pressure sensor property and restart system.
YES
The relationship between the VH and low pressure is normal (see ∗2) when voltage is measured between X21A pins (2) and (3) of outdoor unit PC board (A1P) (see ∗1).
YES
Replace outdoor unit PC board A1P.
NO
Replace the low pressure sensor.
(VF050)

∗1: Voltage measurement point



∗2: Refer to pressure sensor, pressure/voltage characteristics table on P587.

3.25 Low Pressure Drop Due to Refrigerant Shortage or Electronic Expansion Valve Failure

Remote Controller Display

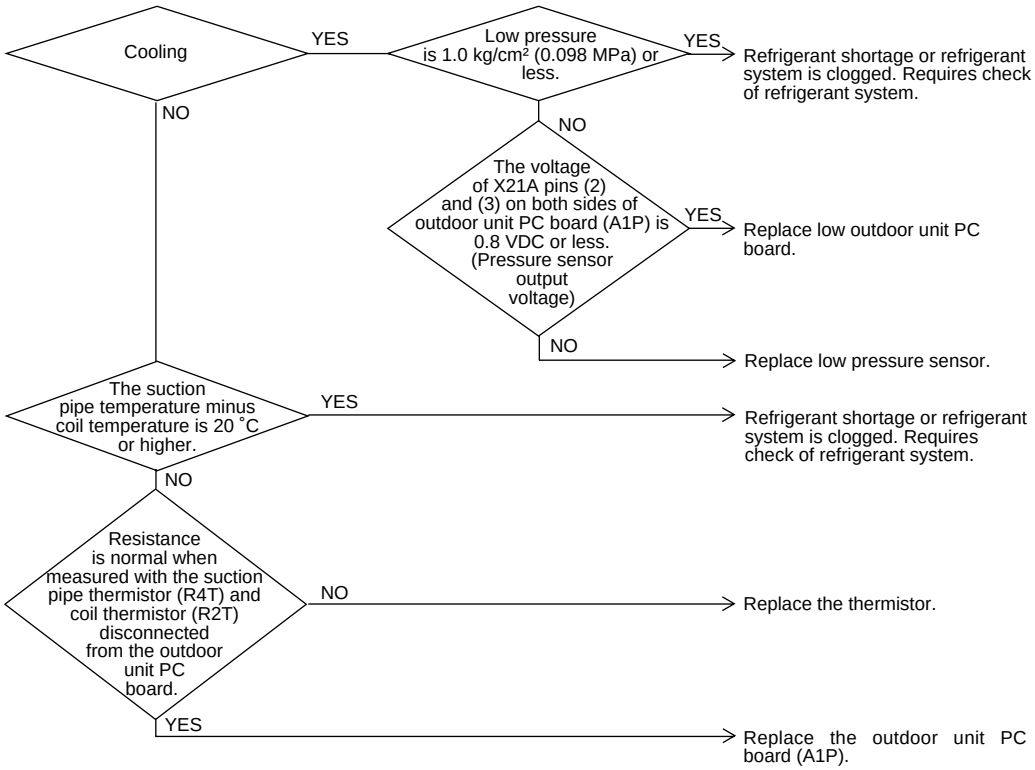
U0

Supposed Causes

- Refrigerant shortage or refrigerant system clogging (incorrect piping)
- Defect of pressure sensor
- Defect of outdoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Cooling
YES
Low pressure is 1.0 kg/cm² (0.098 MPa) or less.
YES
Refrigerant shortage or refrigerant system is clogged. Requires check of refrigerant system.
NO
NO
The voltage of X21A pins (2) and (3) on both sides of outdoor unit PC board (A1P) is 0.8 VDC or less. (Pressure sensor output voltage)
YES
Replace low outdoor unit PC board.
NO
Replace low pressure sensor.
The suction pipe temperature minus coil temperature is 20 ˚C or higher.
YES
Refrigerant shortage or refrigerant system is clogged. Requires check of refrigerant system.
NO
Resistance is normal when measured with the suction pipe thermistor (R4T) and coil thermistor (R2T) disconnected from the outdoor unit PC board.
NO
Replace the thermistor.
YES
Replace the outdoor unit PC board (A1P).

(VF052)

3.26 Negative Phase, Open Phase

Remote Controller Display

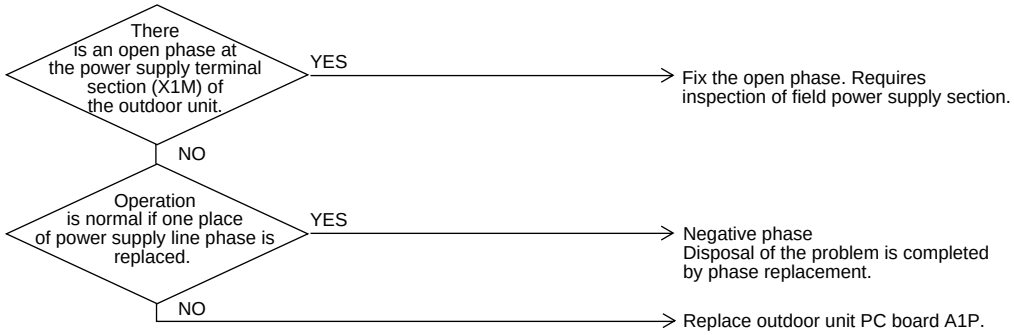
U1

Supposed Causes

- Power supply negative phase
- Power supply open phase
- Defect of outdoor PC board A1P

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


There is an open phase at the power supply terminal section (X1M) of the outdoor unit.
YES
Fix the open phase. Requires inspection of field power supply section.
NO
Operation is normal if one place of power supply line phase is replaced.
YES
Negative phase
Disposal of the problem is completed by phase replacement.
NO
Replace outdoor unit PC board A1P.

(VF053)

3.27 Malfunction of Transmission Between Indoor Units

Remote Controller Display

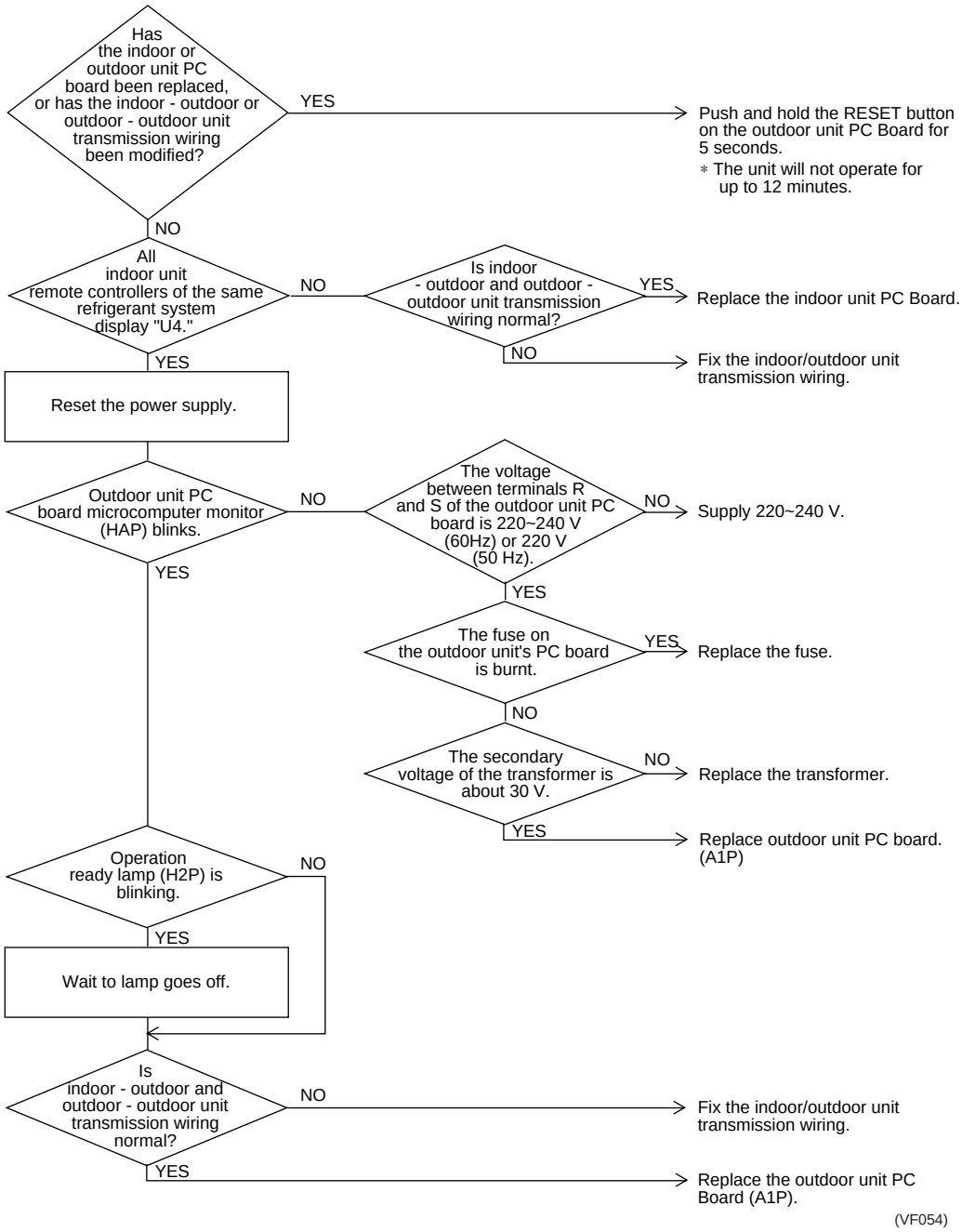
U4

Supposed Causes

- Indoor to outdoor,outdoor to outdoor crossover wiring, disconnection or short circuit
- Outdoor unit power supply is OFF
- System address doesn't match
- Defect of indoor unit PC board
- Defect of outdoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Has the indoor or outdoor unit PC board been replaced, or has the indoor - outdoor or outdoor - outdoor unit transmission wiring been modified?
YES
Push and hold the RESET button on the outdoor unit PC Board for 5 seconds.
* The unit will not operate for up to 12 minutes.
NO
All indoor unit remote controllers of the same refrigerant system display "U4."
NO
Is indoor - outdoor and outdoor - outdoor unit transmission wiring normal?
YES
Replace the indoor unit PC Board.
NO
Fix the indoor/outdoor unit transmission wiring.
YES
Reset the power supply.
Outdoor unit PC board microcomputer monitor (HAP) blinks.
NO
The voltage between terminals R and S of the outdoor unit PC board is 220~240 V (60Hz) or 220 V (50 Hz).
NO
Supply 220~240 V.
YES
YES
The fuse on the outdoor unit's PC board is burnt.
YES
Replace the fuse.
NO
The secondary voltage of the transformer is about 30 V.
NO
Replace the transformer.
YES
Replace outdoor unit PC board. (A1P)
Operation ready lamp (H2P) is blinking.
NO
YES
Wait to lamp goes off.
Is indoor - outdoor and outdoor - outdoor unit transmission wiring normal?
NO
Fix the indoor/outdoor unit transmission wiring.
YES
Replace the outdoor unit PC Board (A1P).

(VF054)

3.28 Malfunction of Transmission Between Remote Controller and Indoor Unit

Remote Controller Display

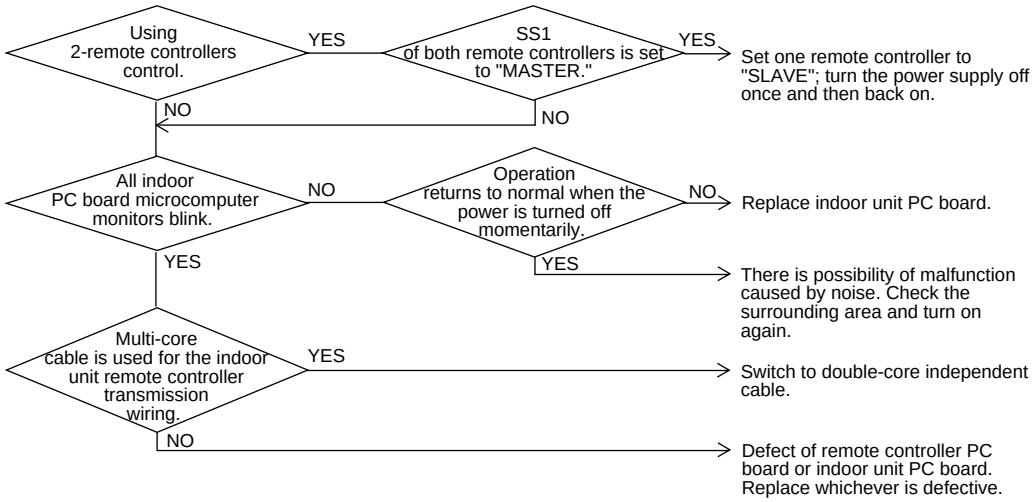
U5

Supposed Causes

- Malfunction of indoor unit remote controller transmission
- Connection of two main remote controllers (when using 2 remote controllers)
- Defect of indoor unit PC board
- Defect of remote controller PC board
- Malfunction of transmission caused by noise

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Using 2-remote controllers control.
YES
SS1 of both remote controllers is set to "MASTER."
YES
Set one remote controller to "SLAVE"; turn the power supply off once and then back on.
NO
NO
All indoor PC board microcomputer monitors blink.
NO
Operation returns to normal when the power is turned off momentarily.
NO
Replace indoor unit PC board.
YES
YES
There is possibility of malfunction caused by noise. Check the surrounding area and turn on again.
Multi-core cable is used for the indoor unit remote controller transmission wiring.
YES
Switch to double-core independent cable.
NO
Defect of remote controller PC board or indoor unit PC board. Replace whichever is defective.

(VF055)

3.29 Malfunction of Transmission Between Outdoor Units

Remote Controller Display

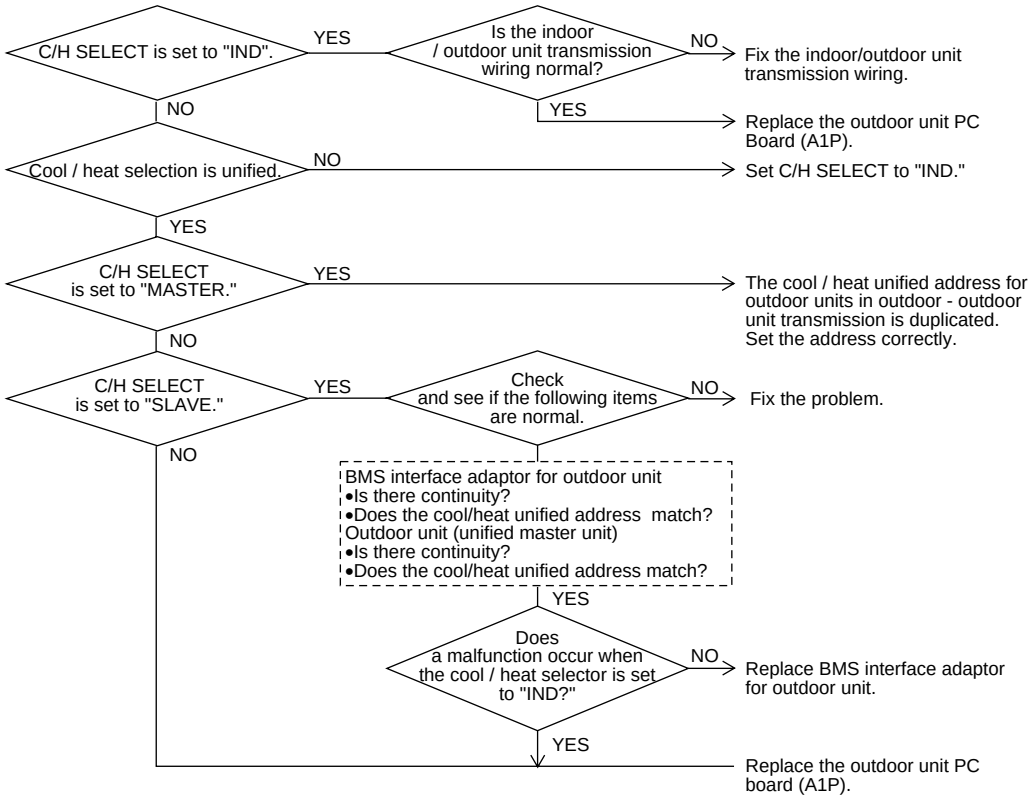
U7

Supposed Causes

- Improper connection of transmission wiring between outdoor unit and BMS interface adaptor for outdoor unit
- Improper cool/heat selection
- Improper cool/heat unified address (outdoor unit, BMS interface adaptor for outdoor unit)
- Defect of outdoor unit PC board (A1P)
- Defect of BMS interface adaptor for outdoor unit

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


C/H SELECT is set to "IND".
YES
Is the indoor / outdoor unit transmission wiring normal?
NO
Fix the indoor/outdoor unit transmission wiring.
YES
Replace the outdoor unit PC Board (A1P).
NO
Cool / heat selection is unified.
NO
Set C/H SELECT to "IND."
YES
C/H SELECT is set to "MASTER."
YES
The cool / heat unified address for outdoor units in outdoor - outdoor unit transmission is duplicated. Set the address correctly.
NO
C/H SELECT is set to "SLAVE."
YES
Check and see if the following items are normal.
NO
Fix the problem.
NO
BMS interface adaptor for outdoor unit
•Is there continuity?
•Does the cool/heat unified address match?
Outdoor unit (unified master unit)
•Is there continuity?
•Does the cool/heat unified address match?
YES
Does a malfunction occur when the cool / heat selector is set to "IND?"
NO
Replace BMS interface adaptor for outdoor unit.
YES
Replace the outdoor unit PC board (A1P).

(VF056)

3.30 Malfunction of Transmission Between Master and Slave Remote Controllers

Remote Controller Display

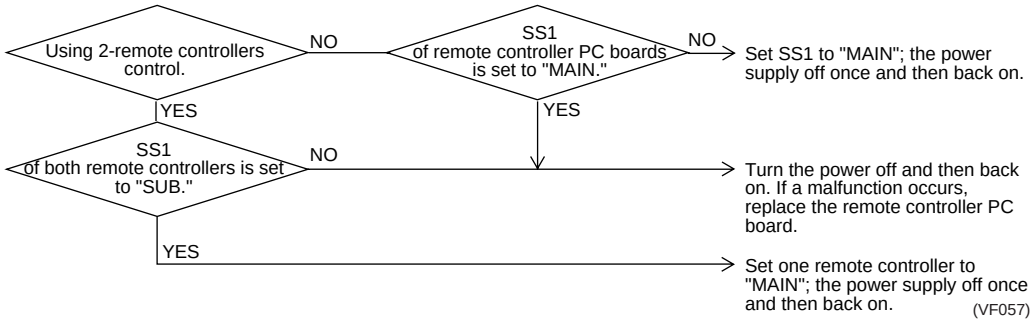
U8

Supposed Causes

- Malfunction of transmission between main and sub remote controller
- Connection between sub remote controllers
- Defect of remote controller PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Using 2-remote controllers control.
NO
SS1 of remote controller PC boards is set to "MAIN."
NO
Set SS1 to "MAIN"; the power supply off once and then back on.
YES
YES
SS1 of both remote controllers is set to "SUB."
NO
Turn the power off and then back on. If a malfunction occurs, replace the remote controller PC board.
YES
Set one remote controller to "MAIN"; the power supply off once and then back on.
(VF057)

3.31 Malfunction of Transmission Between Indoor and Outdoor Units in the Same System

Remote Controller Display

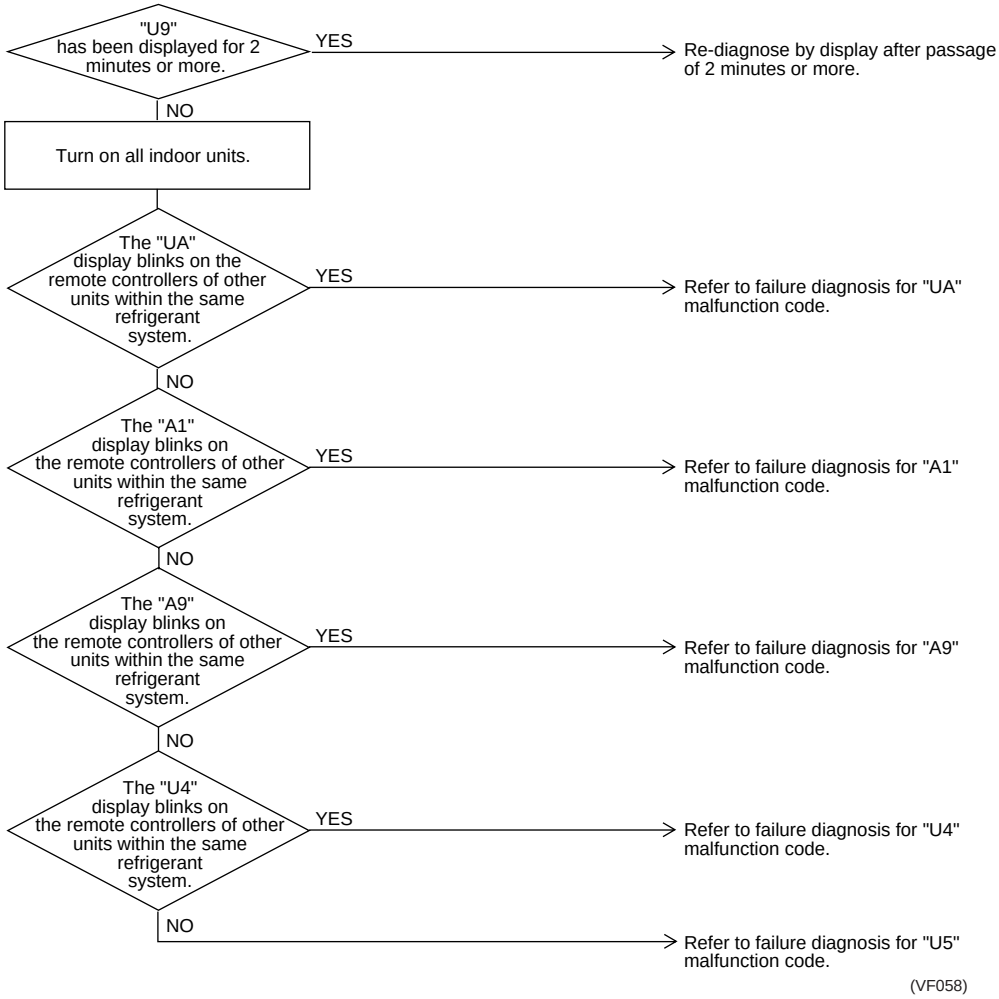
U9

Supposed Causes

- Malfunction of transmission between indoor and outdoor of other system
- Malfunction of electronic expansion valve in indoor unit of other system
- Defect of PC board of indoor unit in other system
- Improper connection of transmission wiring between indoor and outdoor unit

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


"U9" has been displayed for 2 minutes or more.
YES
Re-diagnose by display after passage of 2 minutes or more.
NO
Turn on all indoor units.
The "UA" display blinks on the remote controllers of other units within the same refrigerant system.
YES
Refer to failure diagnosis for "UA" malfunction code.
NO
The "A1" display blinks on the remote controllers of other units within the same refrigerant system.
YES
Refer to failure diagnosis for "A1" malfunction code.
NO
The "A9" display blinks on the remote controllers of other units within the same refrigerant system.
YES
Refer to failure diagnosis for "A9" malfunction code.
NO
The "U4" display blinks on the remote controllers of other units within the same refrigerant system.
YES
Refer to failure diagnosis for "U4" malfunction code.
NO
Refer to failure diagnosis for "U5" malfunction code.
(VF058)

3.32 Excessive Number of Indoor Units

Remote Controller Display

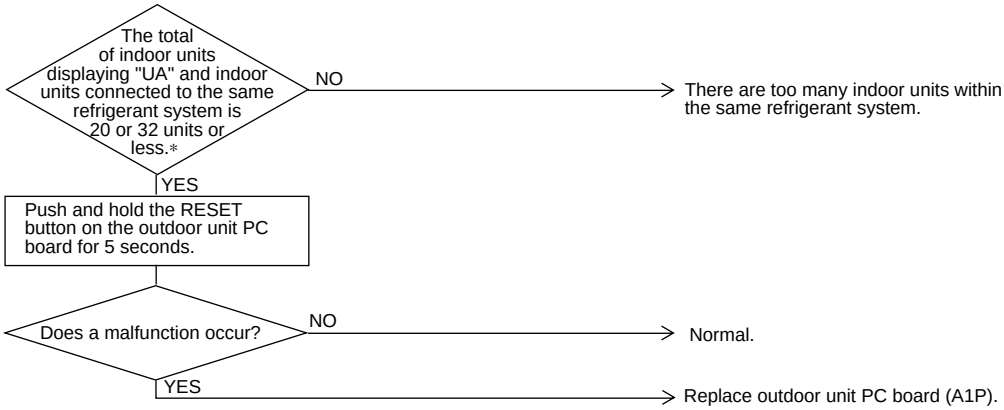
UA

Supposed Causes

- Excess of connected indoor units
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The total of indoor units displaying "UA" and indoor units connected to the same refrigerant system is 20 or 32 units or less.*
NO
There are too many indoor units within the same refrigerant system.
YES
Push and hold the RESET button on the outdoor unit PC board for 5 seconds.
Does a malfunction occur?
NO
Normal.
YES
Replace outdoor unit PC board (A1P).

(VF059)

The number of indoor units that can be connected to a single outdoor unit system depends on the type of outdoor unit.

* PA-16·18·20MA1XPK ··· 20 units
  PA-24~30MA1XPK ··· 32 units

3.33 Address Duplication of Central Remote Controller

Remote Controller Display

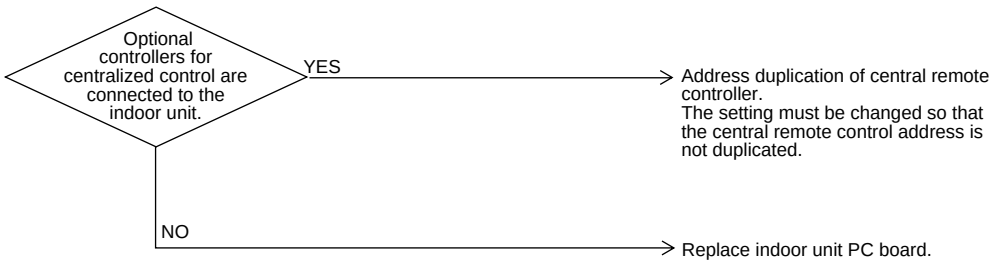
UC

Supposed Causes

- Address duplication of central remote controller
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Optional controllers for centralized control are connected to the indoor unit.
YES
Address duplication of central remote controller.
The setting must be changed so that the central remote control address is not duplicated.
NO
Replace indoor unit PC board.

(VF060)

3.34 Refrigerant System not Set, Incompatible Wiring/Piping

Remote Controller Display

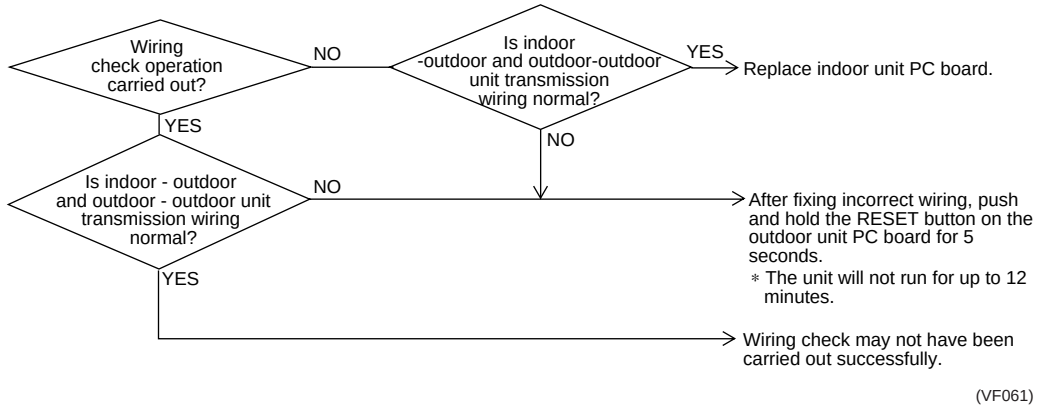
UF

Supposed Causes

- Improper connection of transmission wiring between indoor-outdoor unit and outdoor-outdoor unit
- Failure to execute wiring check operation
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Wiring check operation carried out?
NO
Is indoor -outdoor and outdoor-outdoor unit transmission wiring normal?
YES
Replace indoor unit PC board.
YES
NO
Is indoor - outdoor and outdoor - outdoor unit transmission wiring normal?
NO
After fixing incorrect wiring, push and hold the RESET button on the outdoor unit PC board for 5 seconds.
∗ The unit will not run for up to 12 minutes.
YES
Wiring check may not have been carried out successfully.
(VF061)

Wiring check may not be successful if carried out after the outdoor unit has been off for more than 12 hours, or if it is not carried out after running all connected indoor units in the fan mode for at least an hour.

3.35 Malfunction of System, Refrigerant System Address Undefined

Remote Controller Display

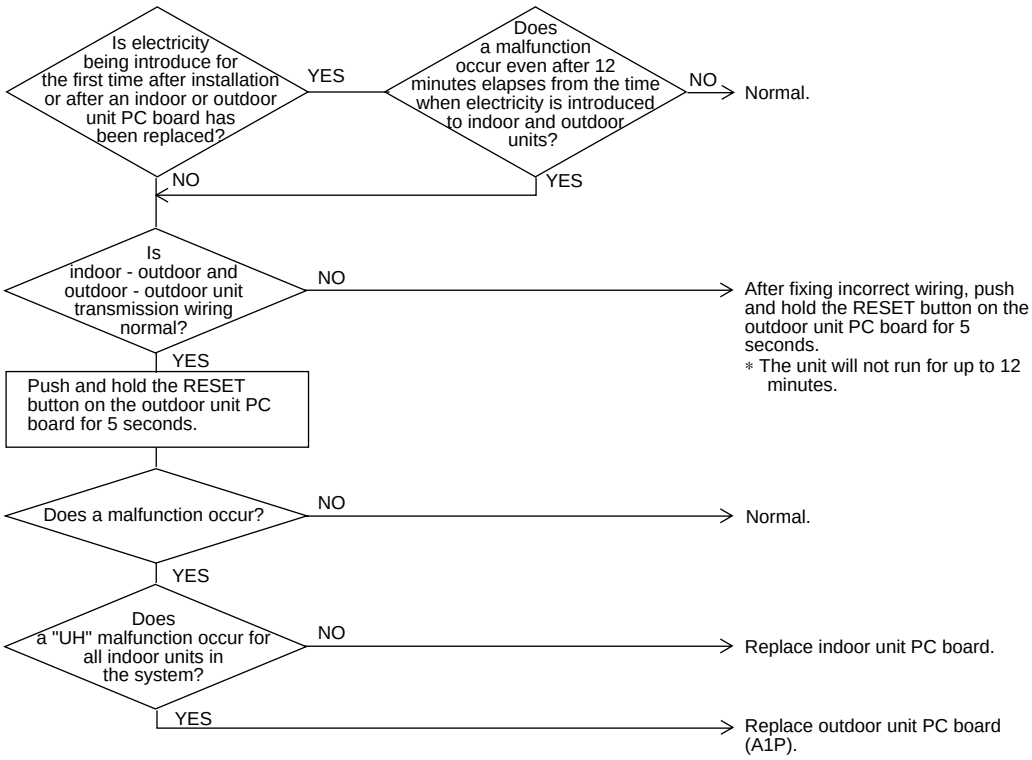
UH

Supposed Causes

- Improper connection of transmission wiring between indoor-outdoor unit and outdoor-outdoor unit
- Defect of indoor unit PC board
- Defect of outdoor unit PC board (A1P)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is electricity being introduce for the first time after installation or after an indoor or outdoor unit PC board has been replaced?
YES
Does a malfunction occur even after 12 minutes elapses from the time when electricity is introduced to indoor and outdoor units?
NO
Normal.
NO
YES
Is indoor - outdoor and outdoor - outdoor unit transmission wiring normal?
NO
After fixing incorrect wiring, push and hold the RESET button on the outdoor unit PC board for 5 seconds.
∗ The unit will not run for up to 12 minutes.
YES
Push and hold the RESET button on the outdoor unit PC board for 5 seconds.
Does a malfunction occur?
NO
Normal.
YES
Does a "UH" malfunction occur for all indoor units in the system?
NO
Replace indoor unit PC board.
YES
Replace outdoor unit PC board (A1P).

(VF062)

4. Failure Diagnosis for Inverter System

4.1 Points of Diagnosis

The main causes for each malfunction code are given in the table below. (For details refer to the next page and those following.)

◎ : Failure is probable
○ : Failure is possible
□ : Failure is improbable
— : Failure is impossible

Malfunction code	Contents of malfunction	Location of failure							Point of diagnosis
		Inverter		Compressor	Refrigerant system	Outdoor unit PC board	Other	Field cause	
		PC board power unit	Other						
L4	Radiator fin temperature rise	□	◎	—	—	—	—	□	Is the intake port of the radiator fin clogged?
L5	Instantaneous over-current	○	—	◎	□	—	—	—	Inspect the compressor.
L8	Electronic thermostat	□	—	◎	○	—	—	—	Inspection the compressor and refrigerant system.
L9	Stall prevention	□	—	○	◎	—	—	—	Inspection the compressor and refrigerant system.
LC	Malfunction of transmission between inverter PC board and outdoor unit PC board	○	◎	—	—	□	—	—	Inspect the connection between the inverter PC board and outdoor unit PC board. Next, inspect the inverter PC board.
U2	Abnormal current/ voltage	○	○	—	—	—	□	◎	• Inspect the fuse on the inverter PC board. • Check the DC voltage.
P1	Over-ripple protection	○	○	—	—	—	—	○	• Open phase • Current/voltage imbalance • Defect of main circuit wiring
P4	Defect of radiator fin temperature sensor	○	□	—	—	—	—	—	Inspect the radiator fin thermistor.

4.2 How to Use The Monitor Switch on The Inverter PC Board

The monitor lets you know the contents of the latest stop due to malfunction by LED display on the inverter PC Board. The inverter is equipped with a retry function that retries operation each time stop due to malfunction occurs, and malfunction is therefore not ascertained by merely entering the five minutes standby while retry is attempted the prescribed number of times. If the number of retry times is exceeded within 60 minutes, malfunction is ascertained, and the corresponding malfunction code is displayed on the indoor unit remote controller.

LED	A	1	2	3	4	Malfunction contents	Retry times
	◑	●	●	●	●	Normal	
	◑	●	●	●	○	Malfunction of fin thermistor	3
	◑	○	○	●	●	Sensor malfunction	0
	◑	○	●	●	○	Insufficient voltage	3
	◑	●	●	○	●	Instantaneous over-current	3
	◑	●	○	○	○	Electronic thermistor	3
	◑	○	○	○	○	Stall prevention	3
	◑	●	○	●	●	Open phase detection	3
	●	●	●	●	●	Malfunction of microcomputer	Unlimited

◑ : Blink
○ : On
● : Off

5. Troubleshooting (Inverter)

5.1 Outdoor Unit: Malfunction of Inverter Radiating Fin Temperature Rise

Remote Controller Display

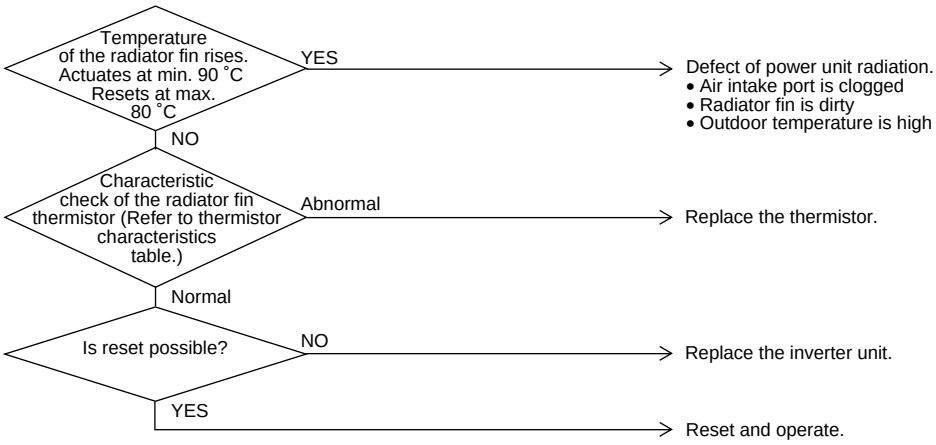
L4

Supposed Causes

- Actuation of fin thermal (Actuates at min. 90°C and resets at max. 80°C)
- Defect of inverter PC board
- Defect of fin thermistor

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Temperature of the radiator fin rises. Actuates at min. 90 ˚C Resets at max. 80 ˚C
YES
Defect of power unit radiation.
• Air intake port is clogged
• Radiator fin is dirty
• Outdoor temperature is high
NO
Characteristic check of the radiator fin thermistor (Refer to thermistor characteristics table.)
Abnormal
Replace the thermistor.
Normal
Is reset possible?
NO
Replace the inverter unit.
YES
Reset and operate.

(VF063)

5.2 Outdoor Unit: Inverter Instantaneous Over-Current

Remote Controller Display

L5

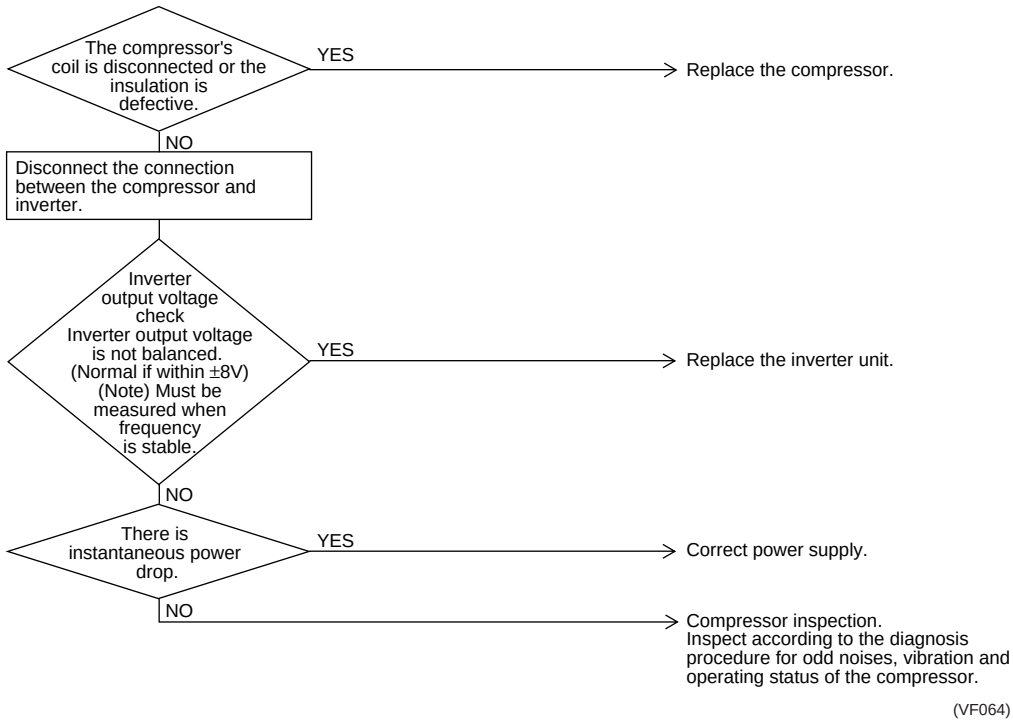
Supposed Causes

- Defect of compressor coil (disconnected, defective insulation)
- Compressor start-up malfunction (mechanical lock)
- Defect of inverter unit

Troubleshooting

Compressor inspection

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The compressor's coil is disconnected or the insulation is defective.
YES
Replace the compressor.
NO
Disconnect the connection between the compressor and inverter.
Inverter output voltage check
Inverter output voltage is not balanced. (Normal if within ±8V)
(Note) Must be measured when frequency is stable.
YES
Replace the inverter unit.
NO
There is instantaneous power drop.
YES
Correct power supply.
NO
Compressor inspection.
Inspect according to the diagnosis procedure for odd noises, vibration and operating status of the compressor.

(VF064)

5.3 Outdoor Unit: Inverter Thermostat Sensor, Compressor Overload

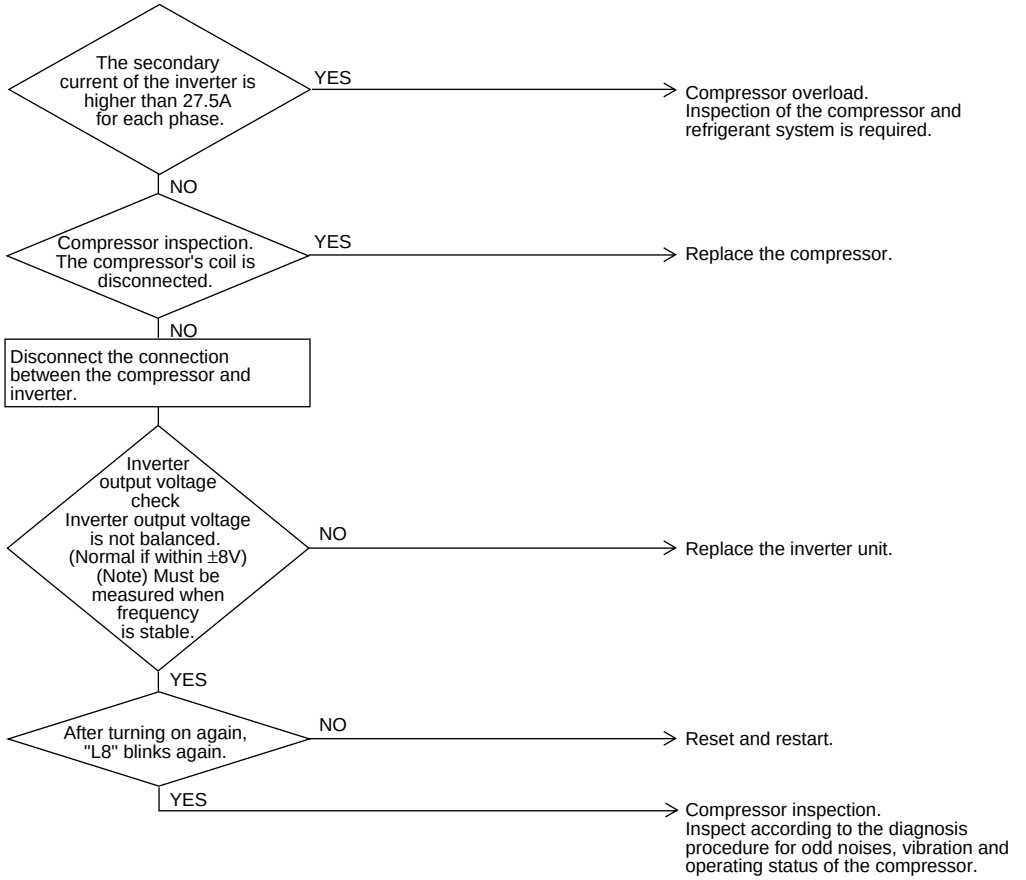
Remote Controller Display L8

Supposed Causes

- Compressor overload
- Compressor coil disconnected
- Defect of inverter unit

Troubleshooting Output current check

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The secondary current of the inverter is higher than 27.5A for each phase.
YES
Compressor overload. Inspection of the compressor and refrigerant system is required.
NO
Compressor inspection. The compressor's coil is disconnected.
YES
Replace the compressor.
NO
Disconnect the connection between the compressor and inverter.
Inverter output voltage check Inverter output voltage is not balanced. (Normal if within ±8V) (Note) Must be measured when frequency is stable.
NO
Replace the inverter unit.
YES
After turning on again, "L8" blinks again.
NO
Reset and restart.
YES
Compressor inspection. Inspect according to the diagnosis procedure for odd noises, vibration and operating status of the compressor.

(VF065)

5.4 Outdoor Unit: Inverter Stall Prevention, Compressor Lock

Remote Controller Display

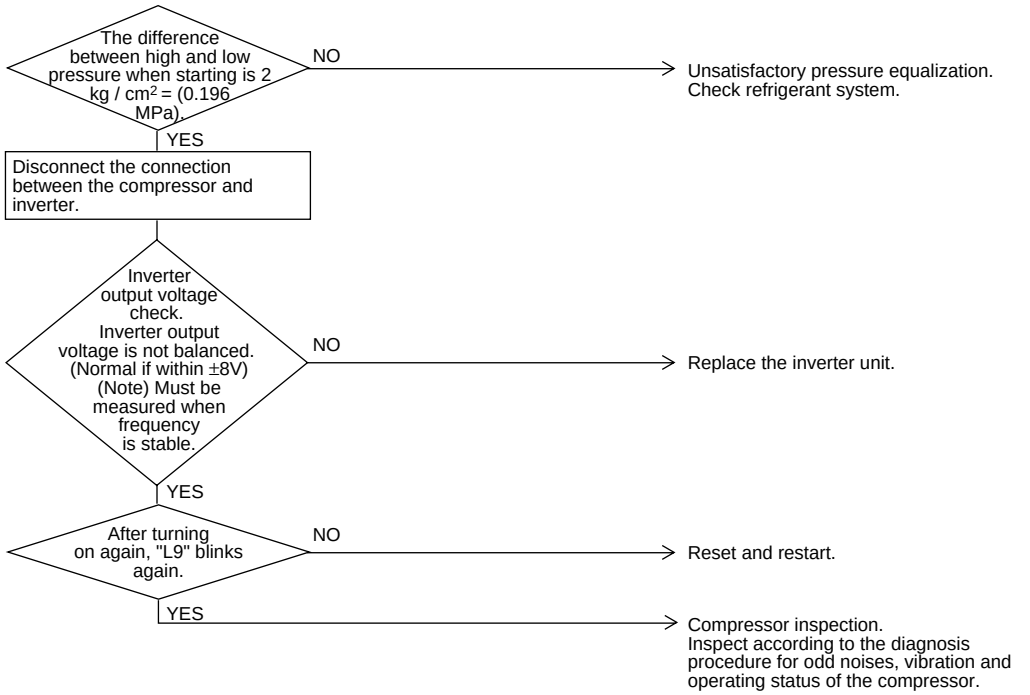
L9

Supposed Causes

- Defect of compressor
- Pressure differential start
- Defect of inverter unit

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


The difference between high and low pressure when starting is 2 kg / cm2 = (0.196 MPa).
NO
Unsatisfactory pressure equalization. Check refrigerant system.
YES
Disconnect the connection between the compressor and inverter.
Inverter output voltage check. Inverter output voltage is not balanced. (Normal if within ±8V) (Note) Must be measured when frequency is stable.
NO
Replace the inverter unit.
YES
After turning on again, "L9" blinks again.
NO
Reset and restart.
YES
Compressor inspection. Inspect according to the diagnosis procedure for odd noises, vibration and operating status of the compressor.

(VF066)

5.5 Outdoor Unit: Malfunction of Transmission Between Inverter and Control PC Board

Remote Controller Display

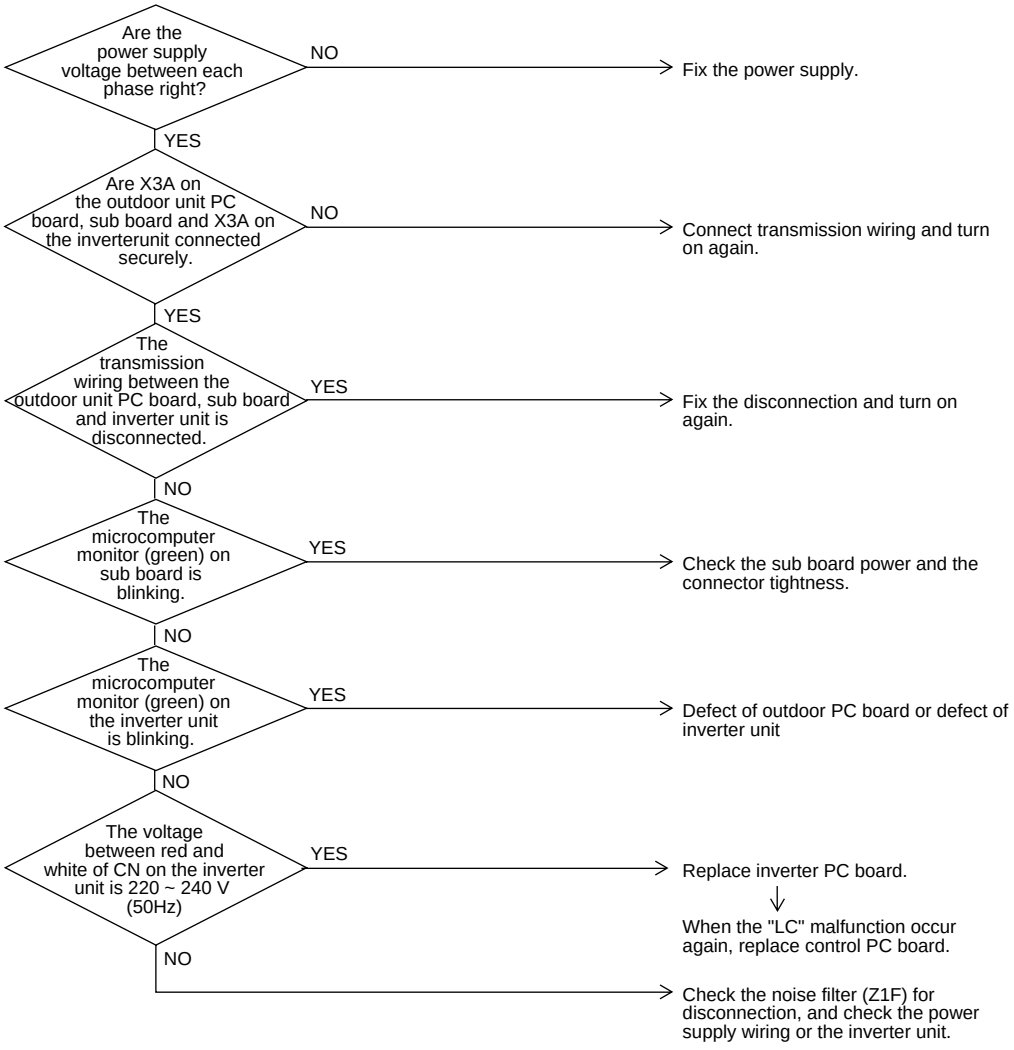
LC

Supposed Causes

- Malfunction of connection between the inverter unit and outdoor unit PC board
- Defect of outdoor unit PC board (transmission section)
- Defect of inverter unit
- Defect of noise filter (NF1)
- Open phase on power supply during outdoor unit operation
- External factor (Noise etc.)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Are the power supply voltage between each phase right?
NO
Fix the power supply.
YES
Are X3A on the outdoor unit PC board, sub board and X3A on the inverterunit connected securely.
NO
Connect transmission wiring and turn on again.
YES
The transmission wiring between the outdoor unit PC board, sub board and inverter unit is disconnected.
YES
Fix the disconnection and turn on again.
NO
The microcomputer monitor (green) on sub board is blinking.
YES
Check the sub board power and the connector tightness.
NO
The microcomputer monitor (green) on the inverter unit is blinking.
YES
Defect of outdoor PC board or defect of inverter unit
NO
The voltage between red and white of CN on the inverter unit is 220 ~ 240 V (50Hz)
YES
Replace inverter PC board.
When the "LC" malfunction occur again, replace control PC board.
NO
Check the noise filter (Z1F) for disconnection, and check the power supply wiring or the inverter unit.

(VF067)

5.6 Power Supply Insufficient or Instantaneous Failure

Remote Controller Display

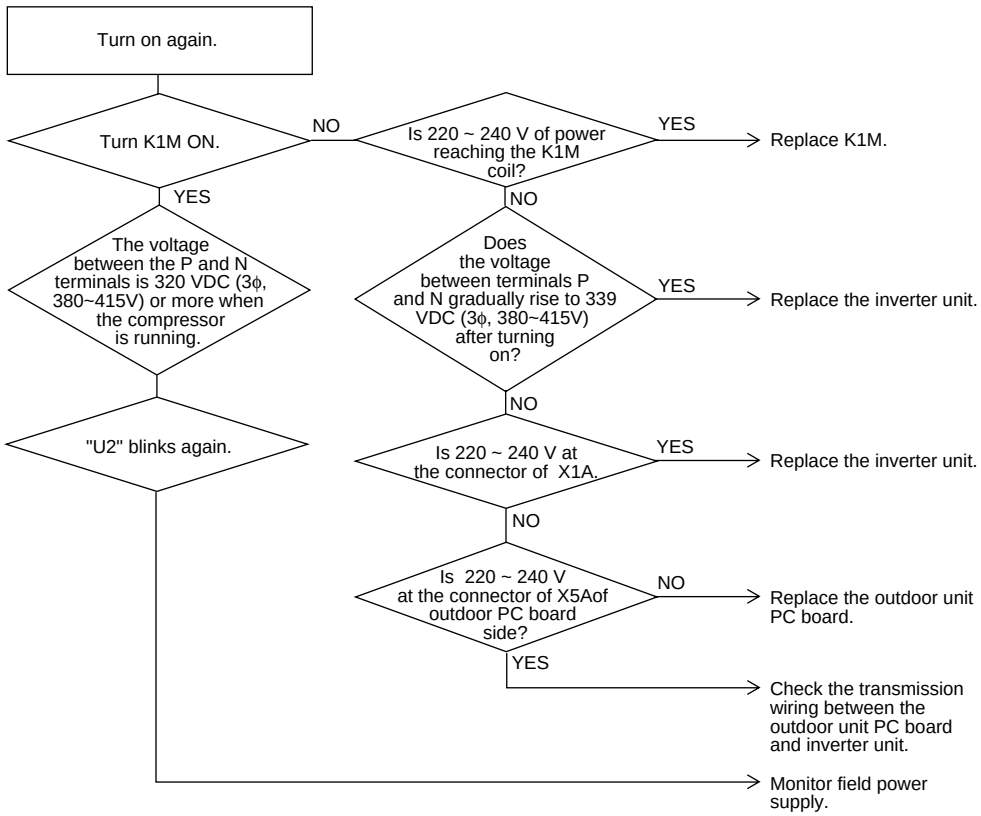
U2

Supposed Causes

- Power supply insufficient
- Instantaneous failure
- Open phase
- Defect of inverter unit
- Defect of outdoor PC board
- Defect of K1M.
- Main circuit wiring defect

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Turn on again.
Turn K1M ON.
NO
Is 220 ~ 240 V of power reaching the K1M coil?
YES
Replace K1M.
YES
NO
The voltage between the P and N terminals is 320 VDC (3ϕ, 380~415V) or more when the compressor is running.
Does the voltage between terminals P and N gradually rise to 339 VDC (3ϕ, 380~415V) after turning on?
YES
Replace the inverter unit.
"U2" blinks again.
NO
Is 220 ~ 240 V at the connector of X1A.
YES
Replace the inverter unit.
NO
Is 220 ~ 240 V at the connector of X5Aof outdoor PC board side?
NO
Replace the outdoor unit PC board.
YES
Check the transmission wiring between the outdoor unit PC board and inverter unit.
Monitor field power supply.

(VF068)

5.7 Outdoor Unit: Inverter Over-Ripple Protection

Remote Controller Display

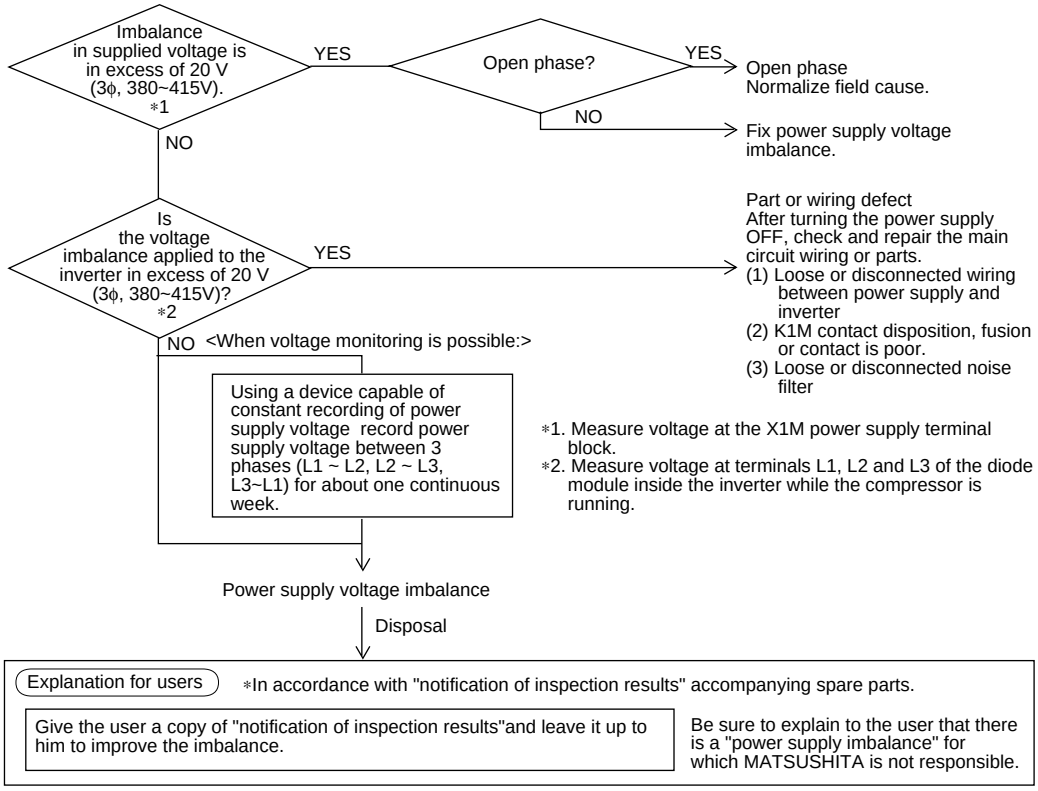
P1

Supposed Causes

- Open phase
- Voltage imbalance between phases
- Defect of main circuit capacitor
- Defect of inverter unit
- Defect of K1M
- Improper main circuit wiring

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Imbalance in supplied voltage is in excess of 20 V (3ϕ, 380~415V). ∗1
YES
Open phase?
YES
Open phase
Normalize field cause.
NO
Fix power supply voltage imbalance.
NO
Is the voltage imbalance applied to the inverter in excess of 20 V (3ϕ, 380~415V)? ∗2
YES
Part or wiring defect
After turning the power supply OFF, check and repair the main circuit wiring or parts.
(1) Loose or disconnected wiring between power supply and inverter
(2) K1M contact disposition, fusion or contact is poor.
(3) Loose or disconnected noise filter
NO <When voltage monitoring is possible:>
Using a device capable of constant recording of power supply voltage record power supply voltage between 3 phases (L1 ~ L2, L2 ~ L3, L3~L1) for about one continuous week.
∗1. Measure voltage at the X1M power supply terminal block.
∗2. Measure voltage at terminals L1, L2 and L3 of the diode module inside the inverter while the compressor is running.
Power supply voltage imbalance
Disposal
Explanation for users
∗In accordance with "notification of inspection results" accompanying spare parts.
Give the user a copy of "notification of inspection results"and leave it up to him to improve the imbalance.
Be sure to explain to the user that there is a "power supply imbalance" for which MATSUSHITA is not responsible.

(VF069)

5.8 Outdoor Unit: Malfunction of Inverter Radiating Fin Temperature Rise Sensor

Remote Controller Display

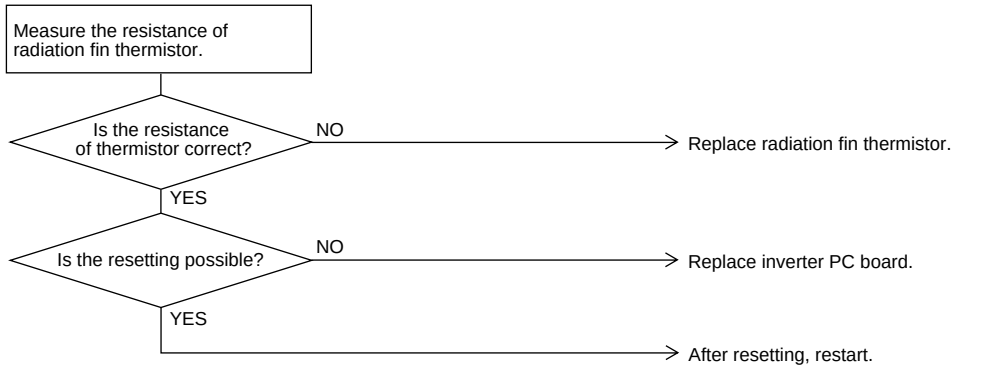
P4

Supposed Causes

- Defect of radiator fin temperature sensor
- Defect of inverter unit

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(VF070)

6. Troubleshooting (OP: Central Remote Controller)

6.1 Malfunction of Transmission Between Central Remote Controller and Indoor Unit

Remote Controller Display

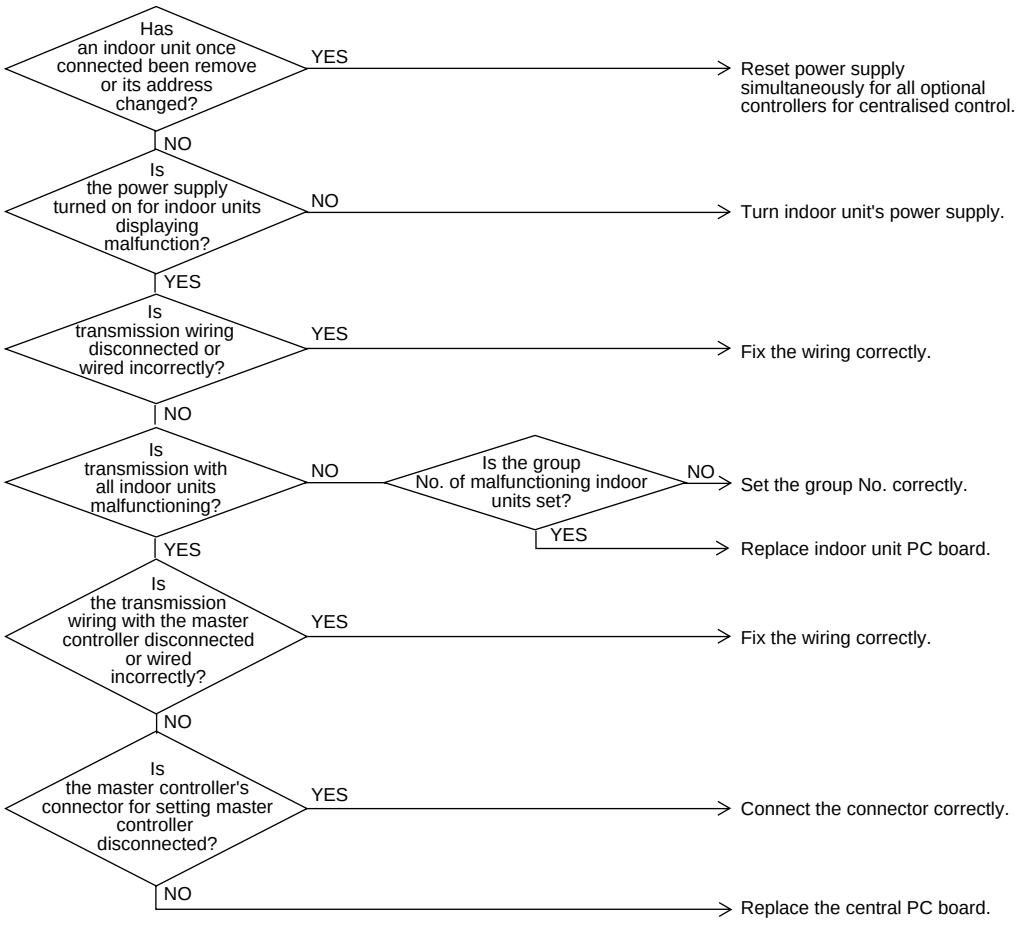
UE

Supposed Causes

- Malfunction of transmission between optional controllers for centralised control and indoor unit
- Connector for setting master controller is disconnected.
- Failure of PC board for central remote controller
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Has an indoor unit once connected been remove or its address changed?
YES
Reset power supply simultaneously for all optional controllers for centralised control.
NO
Is the power supply turned on for indoor units displaying malfunction?
NO
Turn indoor unit's power supply.
YES
Is transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is transmission with all indoor units malfunctioning?
NO
Is the group No. of malfunctioning indoor units set?
NO
Set the group No. correctly.
YES
Replace indoor unit PC board.
YES
Is the transmission wiring with the master controller disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is the master controller's connector for setting master controller disconnected?
YES
Connect the connector correctly.
NO
Replace the central PC board.

(V1896)

6.2 PC Board Defect

Remote Controller Display

Supposed Causes

- Defect of central remote controller PC board

Troubleshooting

Replace the central remote controller PC board.

6.3 Malfunction of Transmission Between Optional Controllers for Centralised Control

Remote Controller Display

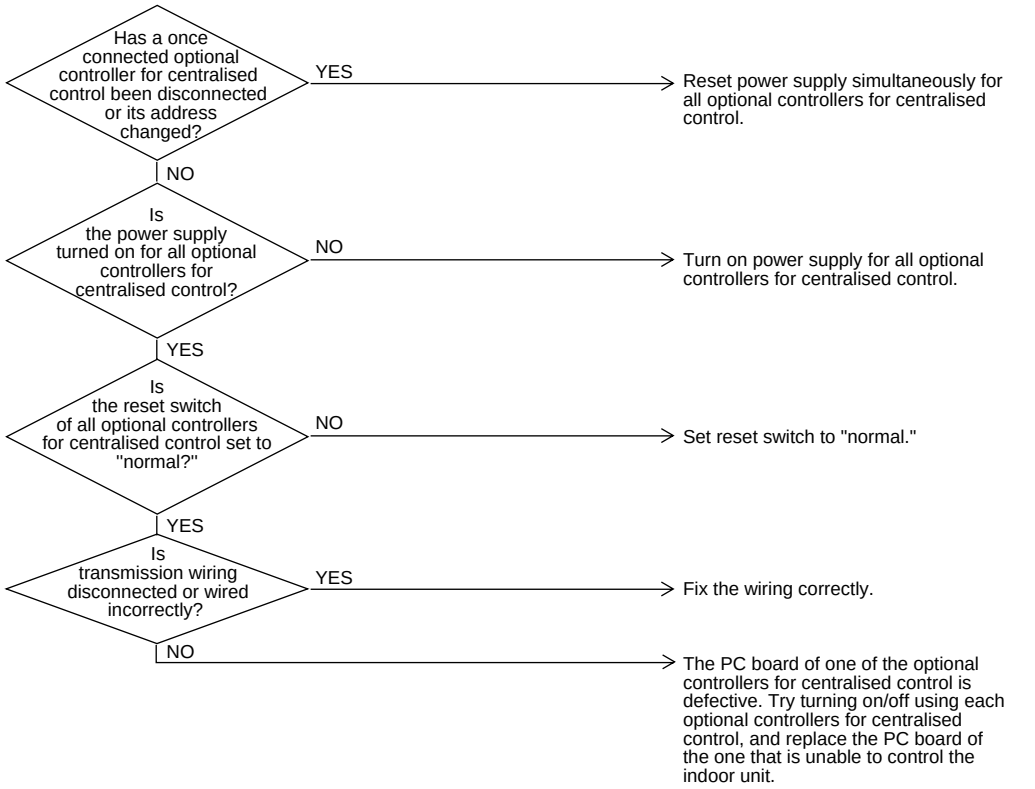
M8

Supposed Causes

- Malfunction of transmission between optional controllers for centralised control
- Defect of PC board of optional controllers for centralised control

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Has a once connected optional controller for centralised control been disconnected or its address changed?
YES
Reset power supply simultaneously for all optional controllers for centralised control.
NO
Is the power supply turned on for all optional controllers for centralised control?
NO
Turn on power supply for all optional controllers for centralised control.
YES
Is the reset switch of all optional controllers for centralised control set to "normal?"
NO
Set reset switch to "normal."
YES
Is transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
The PC board of one of the optional controllers for centralised control is defective. Try turning on/off using each optional controllers for centralised control, and replace the PC board of the one that is unable to control the indoor unit.

(VF072)

6.4 Improper Combination of Optional Controllers for Centralised Control

Remote Controller Display

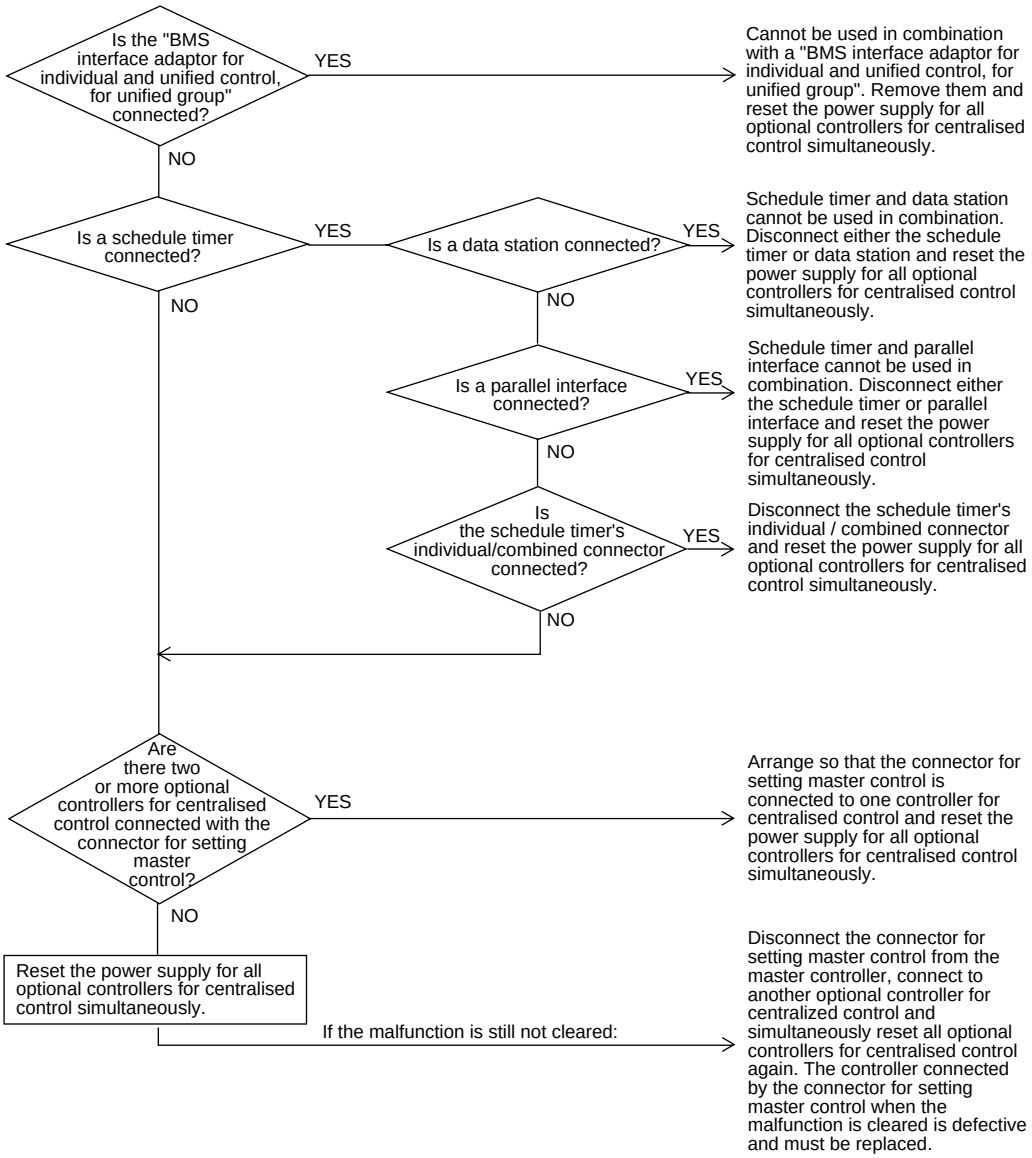
MA

Supposed Causes

- Improper combination of optional controllers for centralised control
- More than one master controller is connected
- Defect of PC board of optional controller for centralised control

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is the "BMS interface adaptor for individual and unified control, for unified group" connected?
YES
Cannot be used in combination with a "BMS interface adaptor for individual and unified control, for unified group". Remove them and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Is a schedule timer connected?
YES
Is a data station connected?
YES
Schedule timer and data station cannot be used in combination. Disconnect either the schedule timer or data station and reset the power supply for all optional controllers for centralised control simultaneously.
NO
NO
Is a parallel interface connected?
YES
Schedule timer and parallel interface cannot be used in combination. Disconnect either the schedule timer or parallel interface and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Is the schedule timer's individual/combined connector connected?
YES
Disconnect the schedule timer's individual / combined connector and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Are there two or more optional controllers for centralised control connected with the connector for setting master control?
YES
Arrange so that the connector for setting master control is connected to one controller for centralised control and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Reset the power supply for all optional controllers for centralised control simultaneously.
If the malfunction is still not cleared:
Disconnect the connector for setting master control from the master controller, connect to another optional controller for centralized control and simultaneously reset all optional controllers for centralised control again. The controller connected by the connector for setting master control when the malfunction is cleared is defective and must be replaced.

(VF073)

6.5 Address Duplication, Improper Setting

Remote Controller Display

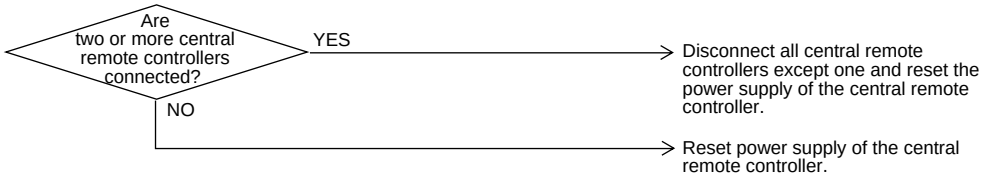
MC

Supposed Causes

- Address duplication of central remote controller

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Are two or more central remote controllers connected?
YES
Disconnect all central remote controllers except one and reset the power supply of the central remote controller.
NO
Reset power supply of the central remote controller.

(VF074)

7. Troubleshooting (OP: Schedule Timer)

7.1 Malfunction of Transmission Between Central Remote Controller and Indoor Unit

Remote Controller Display

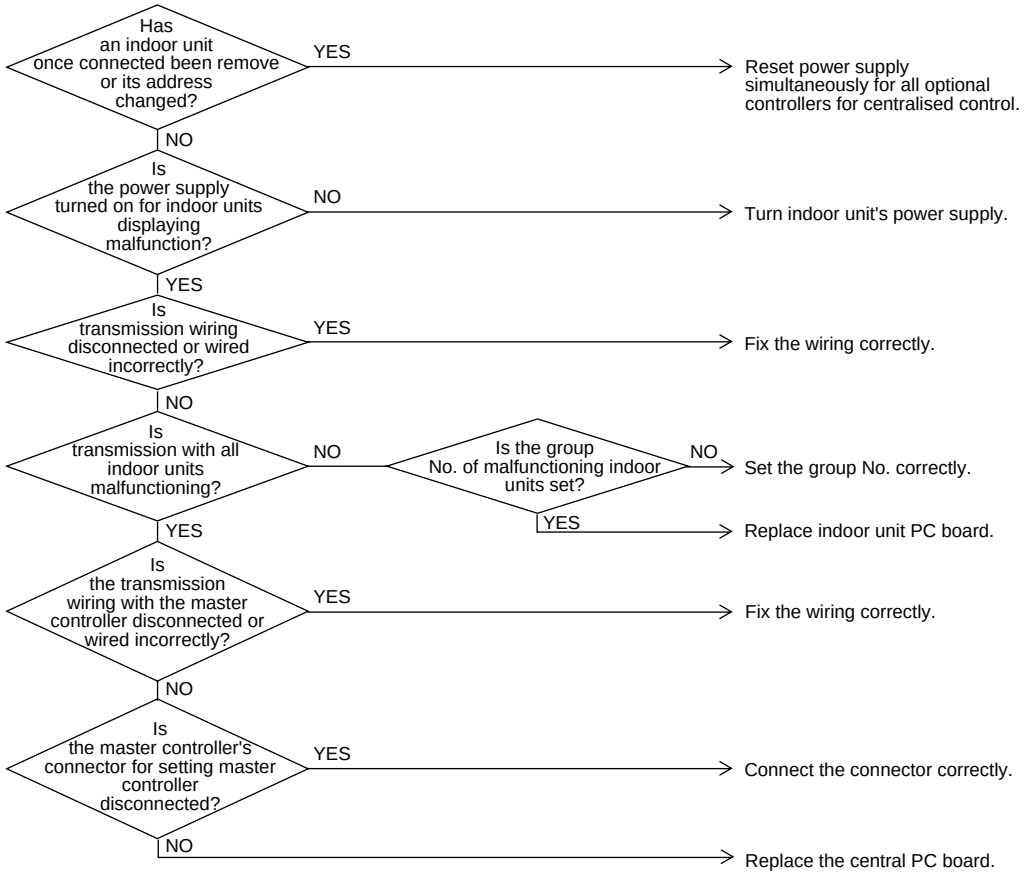
UE

Supposed Causes

- Malfunction of transmission between central remote controller and indoor unit
- Disconnection of connector for setting master controller (or individual/combined switching connector)
- Defect of schedule timer PC board
- Defect of indoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Has an indoor unit once connected been remove or its address changed?
YES
Reset power supply simultaneously for all optional controllers for centralised control.
NO
Is the power supply turned on for indoor units displaying malfunction?
NO
Turn indoor unit's power supply.
YES
Is transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is transmission with all indoor units malfunctioning?
NO
Is the group No. of malfunctioning indoor units set?
NO
Set the group No. correctly.
YES
Replace indoor unit PC board.
YES
Is the transmission wiring with the master controller disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is the master controller's connector for setting master controller disconnected?
YES
Connect the connector correctly.
NO
Replace the central PC board.

(VF075)

7.2 PC Board Defect

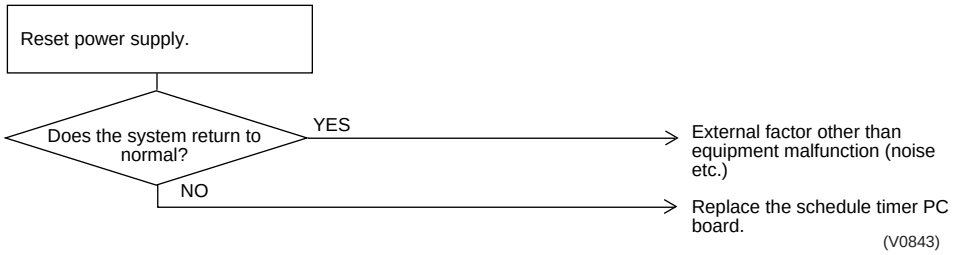
Remote Controller Display

Supposed Causes

- Defect of schedule timer PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



7.3 Malfunction of Transmission Between Optional Controllers for Centralised Control

Remote Controller Display

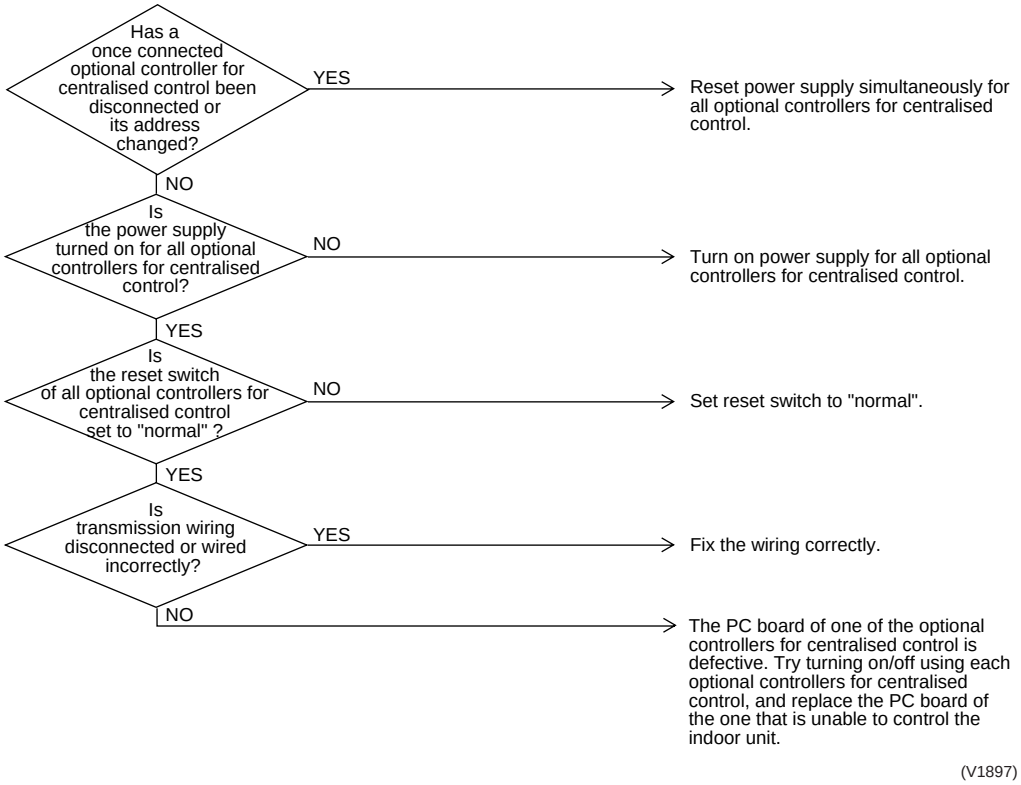
M8

Supposed Causes

- Malfunction of transmission between optional controllers for centralised control
- Defect of PC board of optional controllers for centralised control

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Has a once connected optional controller for centralised control been disconnected or its address changed?
YES
Reset power supply simultaneously for all optional controllers for centralised control.
NO
Is the power supply turned on for all optional controllers for centralised control?
NO
Turn on power supply for all optional controllers for centralised control.
YES
Is the reset switch of all optional controllers for centralised control set to "normal" ?
NO
Set reset switch to "normal".
YES
Is transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
The PC board of one of the optional controllers for centralised control is defective. Try turning on/off using each optional controllers for centralised control, and replace the PC board of the one that is unable to control the indoor unit.

(V1897)

7.4 Improper Combination of Optional Controllers for Centralised Control

Remote Controller Display

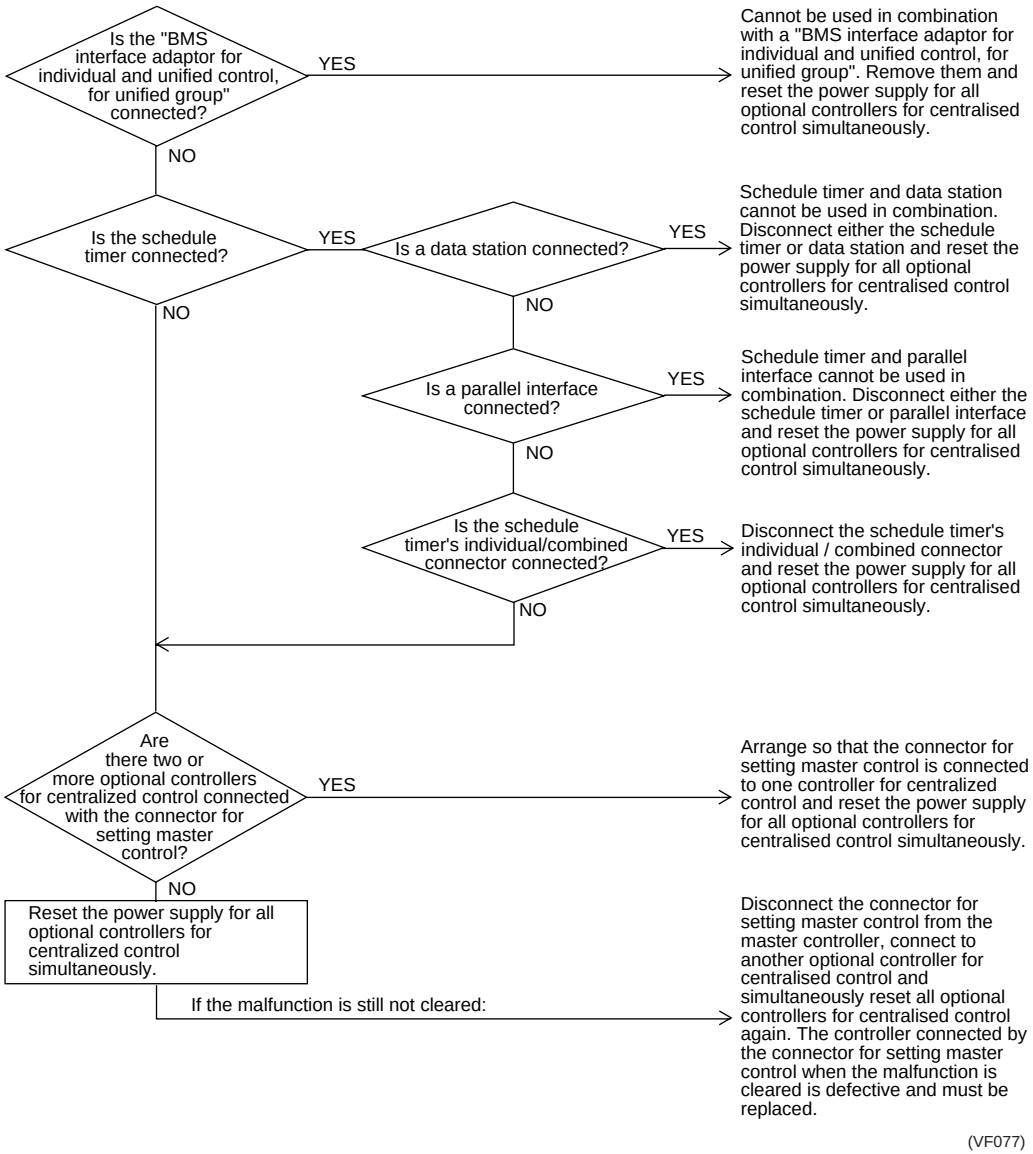
MA

Supposed Causes

- Improper combination of optional controllers for centralised control
- More than one master controller is connected.
- Defect of PC board of optional controllers for centralised control

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is the "BMS interface adaptor for individual and unified control, for unified group" connected?
YES
Cannot be used in combination with a "BMS interface adaptor for individual and unified control, for unified group". Remove them and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Is the schedule timer connected?
YES
Is a data station connected?
YES
Schedule timer and data station cannot be used in combination. Disconnect either the schedule timer or data station and reset the power supply for all optional controllers for centralised control simultaneously.
NO
NO
Is a parallel interface connected?
YES
Schedule timer and parallel interface cannot be used in combination. Disconnect either the schedule timer or parallel interface and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Is the schedule timer's individual/combined connector connected?
YES
Disconnect the schedule timer's individual / combined connector and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Are there two or more optional controllers for centralized control connected with the connector for setting master control?
YES
Arrange so that the connector for setting master control is connected to one controller for centralized control and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Reset the power supply for all optional controllers for centralized control simultaneously.
If the malfunction is still not cleared:
Disconnect the connector for setting master control from the master controller, connect to another optional controller for centralised control and simultaneously reset all optional controllers for centralised control again. The controller connected by the connector for setting master control when the malfunction is cleared is defective and must be replaced.
(VF077)

7.5 Address Duplication, Improper Setting

Remote Controller Display

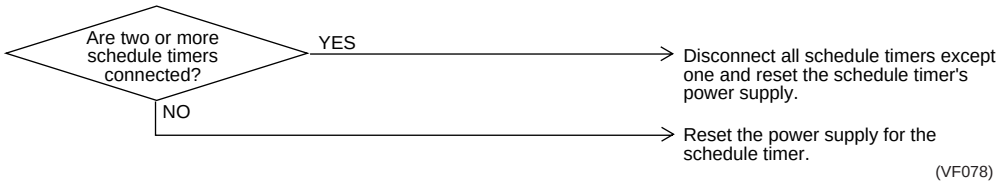
MC

Supposed Causes

- Address duplication of optional controllers for centralised control

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Are two or more schedule timers connected?
YES
Disconnect all schedule timers except one and reset the schedule timer's power supply.
NO
Reset the power supply for the schedule timer.
(VF078)

8. Troubleshooting (OP: Unified ON/OFF Controller)

8.1 Operation Lamp Blinks

Remote Controller Display

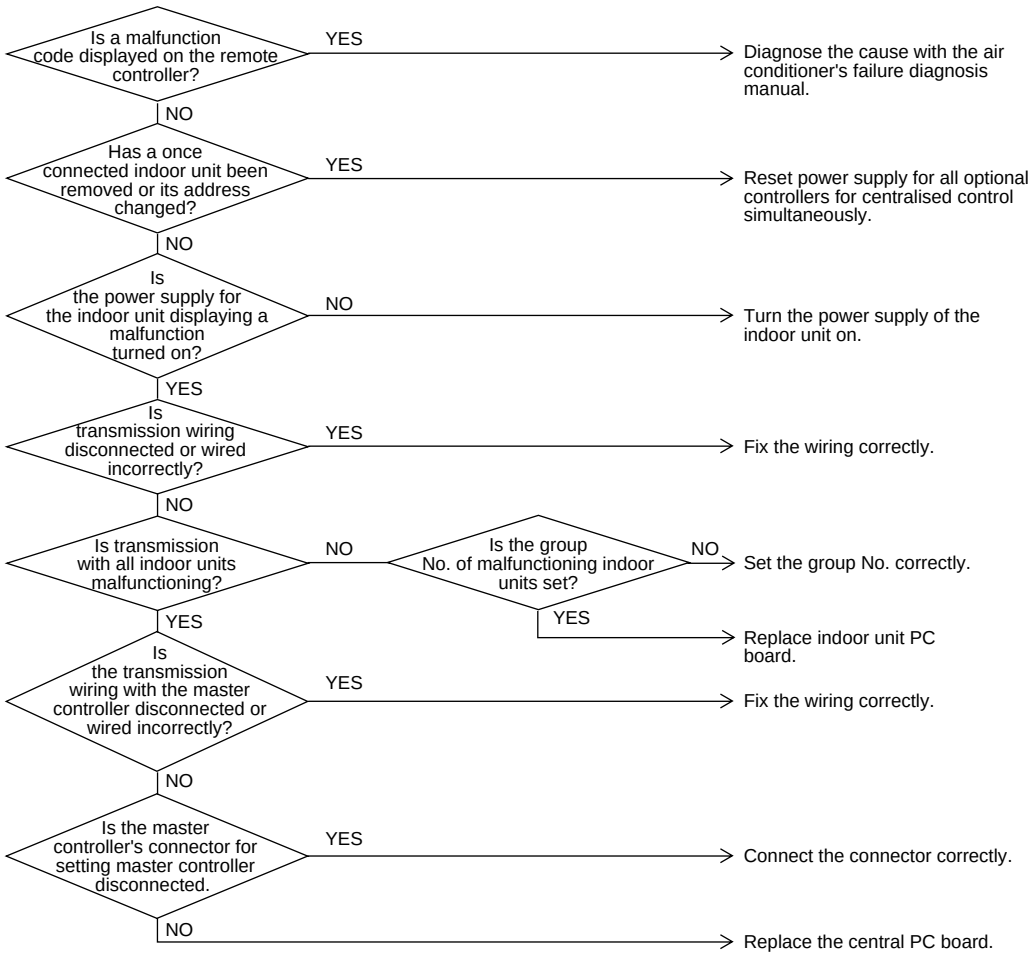
Operation lamp blinks

Suppposed Causes

- Malfunction of transmission between optional controller and indoor unit
- Connector for setting master controller is disconnected
- Defect of unified ON/OFF controller
- Defect of indoor unit PC board
- Malfunction of air conditioner

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is a malfunction code displayed on the remote controller?
YES
Diagnose the cause with the air conditioner's failure diagnosis manual.
NO
Has a once connected indoor unit been removed or its address changed?
YES
Reset power supply for all optional controllers for centralised control simultaneously.
NO
Is the power supply for the indoor unit displaying a malfunction turned on?
NO
Turn the power supply of the indoor unit on.
YES
Is transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is transmission with all indoor units malfunctioning?
NO
Is the group No. of malfunctioning indoor units set?
NO
Set the group No. correctly.
YES
Replace indoor unit PC board.
YES
Is the transmission wiring with the master controller disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is the master controller's connector for setting master controller disconnected.
YES
Connect the connector correctly.
NO
Replace the central PC board.

(V1898)

8.2 Display “Under Host Computer Integrate Control” Blinks (Repeats Single Blink)

Remote Controller Display

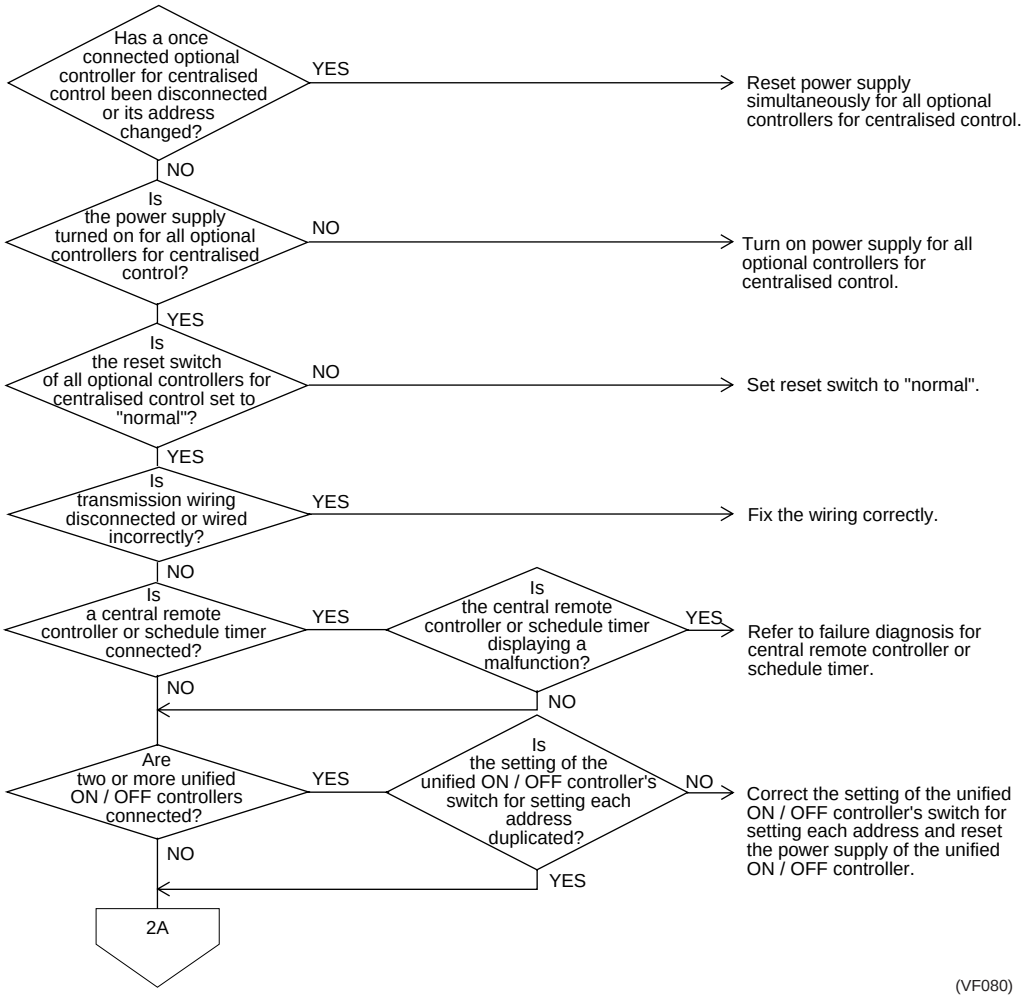
“under host computer integrated control” (Repeats single blink)

Supposed Causes

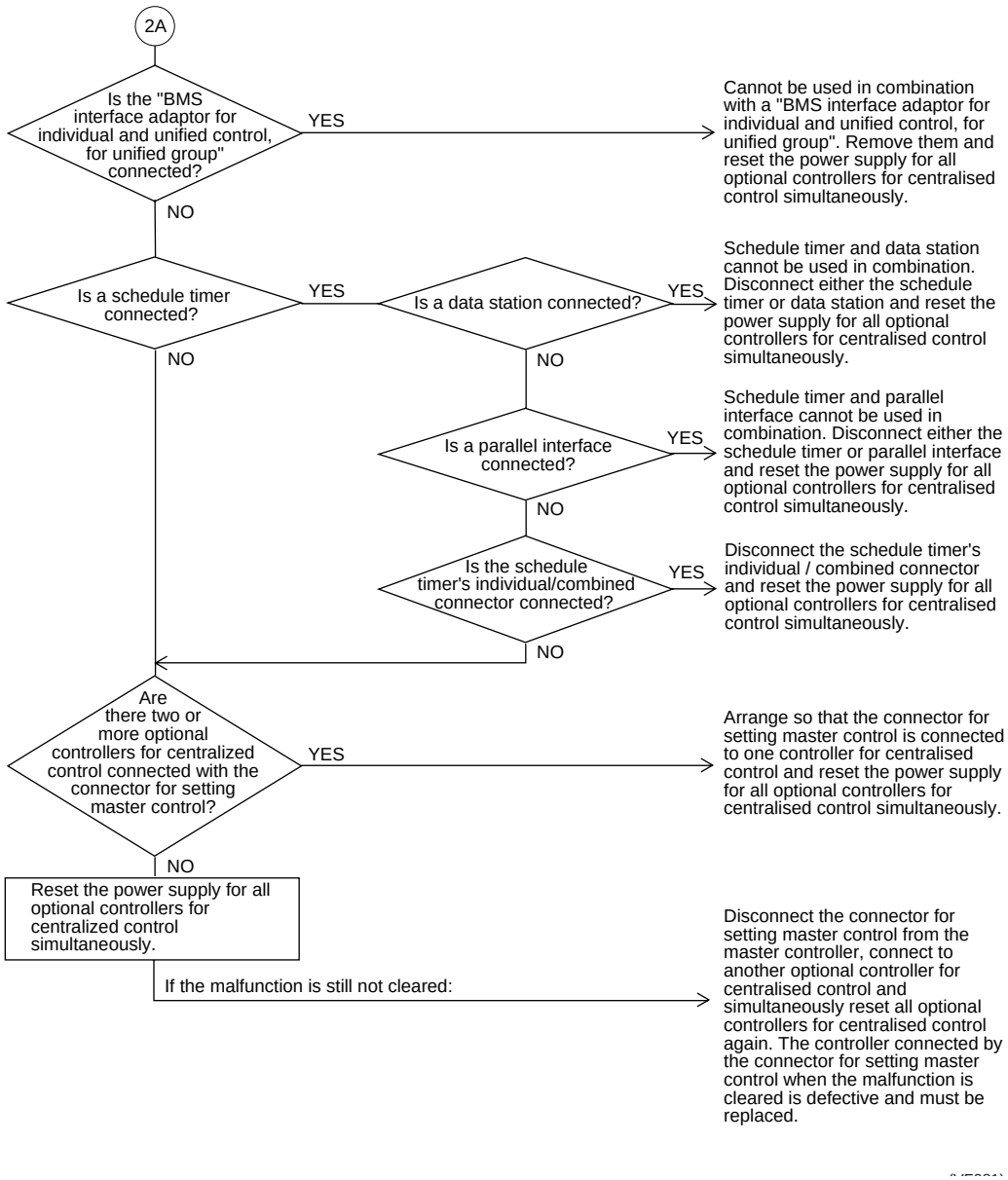
- Address duplication of central remote controller
- Improper combination of optional controllers for centralised control
- Connection of more than one master controller
- Malfunction of transmission between optional controllers for centralised control
- Defect of PC board of optional controllers for centralised control

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Has a once connected optional controller for centralised control been disconnected or its address changed?
YES
Reset power supply simultaneously for all optional controllers for centralised control.
NO
Is the power supply turned on for all optional controllers for centralised control?
NO
Turn on power supply for all optional controllers for centralised control.
YES
Is the reset switch of all optional controllers for centralised control set to "normal"?
NO
Set reset switch to "normal".
YES
Is transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Is a central remote controller or schedule timer connected?
YES
Is the central remote controller or schedule timer displaying a malfunction?
YES
Refer to failure diagnosis for central remote controller or schedule timer.
NO
NO
Are two or more unified ON / OFF controllers connected?
YES
Is the setting of the unified ON / OFF controller's switch for setting each address duplicated?
NO
Correct the setting of the unified ON / OFF controller's switch for setting each address and reset the power supply of the unified ON / OFF controller.
NO
YES
2A

(VF080)


2A
Is the "BMS interface adaptor for individual and unified control, for unified group" connected?
YES
Cannot be used in combination with a "BMS interface adaptor for individual and unified control, for unified group". Remove them and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Is a schedule timer connected?
YES
Is a data station connected?
YES
Schedule timer and data station cannot be used in combination. Disconnect either the schedule timer or data station and reset the power supply for all optional controllers for centralised control simultaneously.
NO
NO
Is a parallel interface connected?
YES
Schedule timer and parallel interface cannot be used in combination. Disconnect either the schedule timer or parallel interface and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Is the schedule timer's individual/combined connector connected?
YES
Disconnect the schedule timer's individual / combined connector and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Are there two or more optional controllers for centralized control connected with the connector for setting master control?
YES
Arrange so that the connector for setting master control is connected to one controller for centralised control and reset the power supply for all optional controllers for centralised control simultaneously.
NO
Reset the power supply for all optional controllers for centralized control simultaneously.
If the malfunction is still not cleared:
Disconnect the connector for setting master control from the master controller, connect to another optional controller for centralised control and simultaneously reset all optional controllers for centralised control again. The controller connected by the connector for setting master control when the malfunction is cleared is defective and must be replaced.

8.3 Display “Under Host Computer Integrate Control” Blinks (Repeats Double Blink)

Remote Controller Display

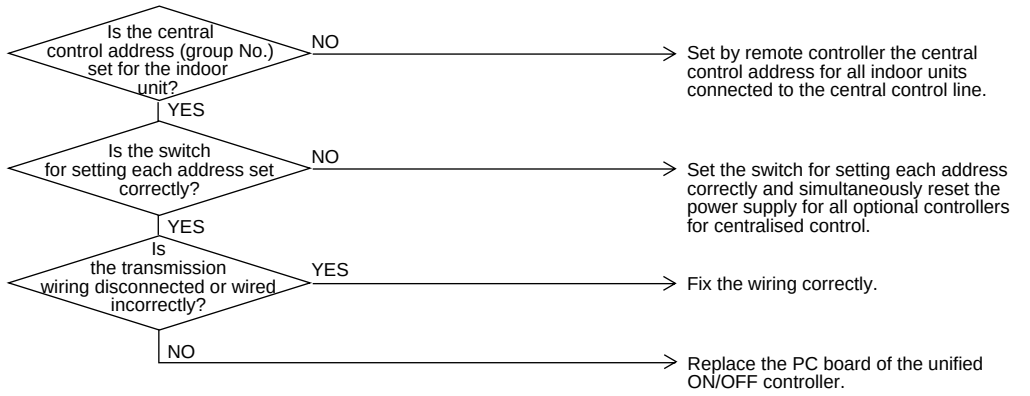
“under host computer integrated control” (Repeats double blink)

Supposed Causes

- Central control address (group No.) is not set for indoor unit.
- Improper address setting
- Improper wiring of transmission wiring

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.


Is the central control address (group No.) set for the indoor unit?
NO
Set by remote controller the central control address for all indoor units connected to the central control line.
YES
Is the switch for setting each address set correctly?
NO
Set the switch for setting each address correctly and simultaneously reset the power supply for all optional controllers for centralised control.
YES
Is the transmission wiring disconnected or wired incorrectly?
YES
Fix the wiring correctly.
NO
Replace the PC board of the unified ON/OFF controller.

(VF082)

Part 5
Special Service Mode

1. Backup and Emergency Operation 558
1.1 Backup and Emergency Operation 558
2. Pump Down Operation 560
2.1 Pump Down Operation 560

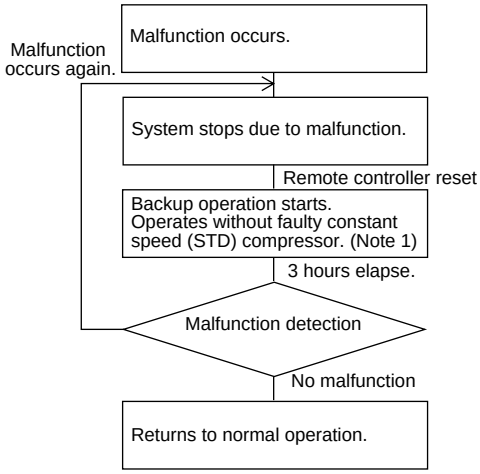
1. Backup and Emergency Operation

1.1 Backup and Emergency Operation

1.1.1 Backup Operation:

When a constant speed type compressor malfunctions due to OC actuation, if you restart operation by remote controller after the unit stops, you can continue to operate the system without the faulty constant speed type compressor.
The system can run by backup operation for up to 3 hours of total indoor unit operating time. When 3 hours is exceeded and the malfunction still remains, the system once again stops due to malfunction. If the malfunction returns to normal, the system continues to operate as is.

Backup Operation Control Flow



(MF168)

After the system briefly stops due malfunction in order to call attention to the problem, backup operation is started by remote controller.

For the reason described above, after about 3 hours of backup operation, the system again carries out malfunction detection, and the system once again stops due to malfunction if an error is detected.

Note: 1. < For 2-compressor system >

- When the STD compressor OC operates, the operation continues using only the inverter compressor based on remote control reset. (for 3 hours only)

< For 3-compressor system >

- When OC operates again immediately after a backup operation (within 5 minutes after STD compressor startup), STD1 and STD2 are switched and operation is retried.
- If OC activates again, only the inverter compressor is used for the operation.
- (In any case, the backup operation ends after 3 hours.)
- The compressor in which OC is activated is prohibited to operate until power reset is conducted for a restart.

1.1.2 Emergency Operation:

Set in setting mode 2. Operates the system when an outdoor unit malfunctions.

1. When an inverter type outdoor unit malfunctions

When an inverter type compressor malfunctions, you can continue operation using constant speed type compressors only.

Emergency Operation Method

1. Set to “EMG” in setting mode 2.

and

2. All indoor units connected to this outdoor unit are turned on by thermostat.

Emergency operation stops at the following conditions.

1. Emergency operation mode is reset on outdoor unit PC board.

or

2. One or more indoor units connected to this outdoor unit are turned off by thermostat.

Setting of Emergency Mode

Setting Method	LED Display						
	H1P	H2P	H3P	H4P	H5P	H6P	H7P
Hold down the Mode button for 5 seconds to change to setting Mode 2.	○	●	●	●	●	●	●
Push SET button and select LED display to “Emergency Mode”.	○	●	●	●	●	●	●
Push the RETURN button.	○	●	●	●	●	●	◑
Push SET button and select LED display as shown right.	○	●	●	●	●	◑	●
Push the RETURN button to enter “Emergency Mode”. ■ All indoor units must be thermostat ON.	○	●	●	●	●	○	●

2. Pump Down Operation

2.1 Pump Down Operation

Pump down operation is carried out when refrigerant is moved to outdoor unit if the indoor unit is necessary to disconnect or replacing. In this case, outdoor unit operates in the cooling mode and indoor unit's electronic expansion valves open for 30 minutes.

2.1.1 Method

1. **Fully shut the liquid side stop valves. (Leave fully open the gas side stop valve)**

2. **Set to pump down mode in setting mode 2 as per table below and execute pump down operation.**

■ **Outdoor unit operate for approximately 30 minutes.**

3. **After unit stopping, shut the stop valve of the gas pipe.**

Setting of Pump Down Mode

Setting Method		LED Display						
		H1P	H2P	H3P	H4P	H5P	H6P	H7P
Hold down the Mode button for 5 seconds to change to setting Mode 2.		○	●	●	●	●	●	●
Push SET button and select LED display to "Pump down operation".		○	●	●	○	○	○	●
Push the RETURN button.		○	●	●	●	●	●	◑
Push SET button and select LED display as shown right.		○	●	●	●	●	◑	●
Push the RETURN button twice to start operation.		○ ◑	● ◑	● ●	● ●	● ●	○ ●	● ●
During pump down operation, low pressure level is displayed as shown right.	Over 0.343MPa	○	○	○	○	○	○	○
	Below 0.343MPa	○	○	●	●	○	○	○
	Below 0.245MPa	○	○	●	●	●	○	○
	Below 0.147MPa	○	○	●	●	●	●	○
Pump down operation completed ■ Final pressure level is shown with blinking or H2P is shown ON.		○	○	◑	◑	◑	◑	◑
Push MODE button once to complete this procedure.		○	●	●	●	●	○	●

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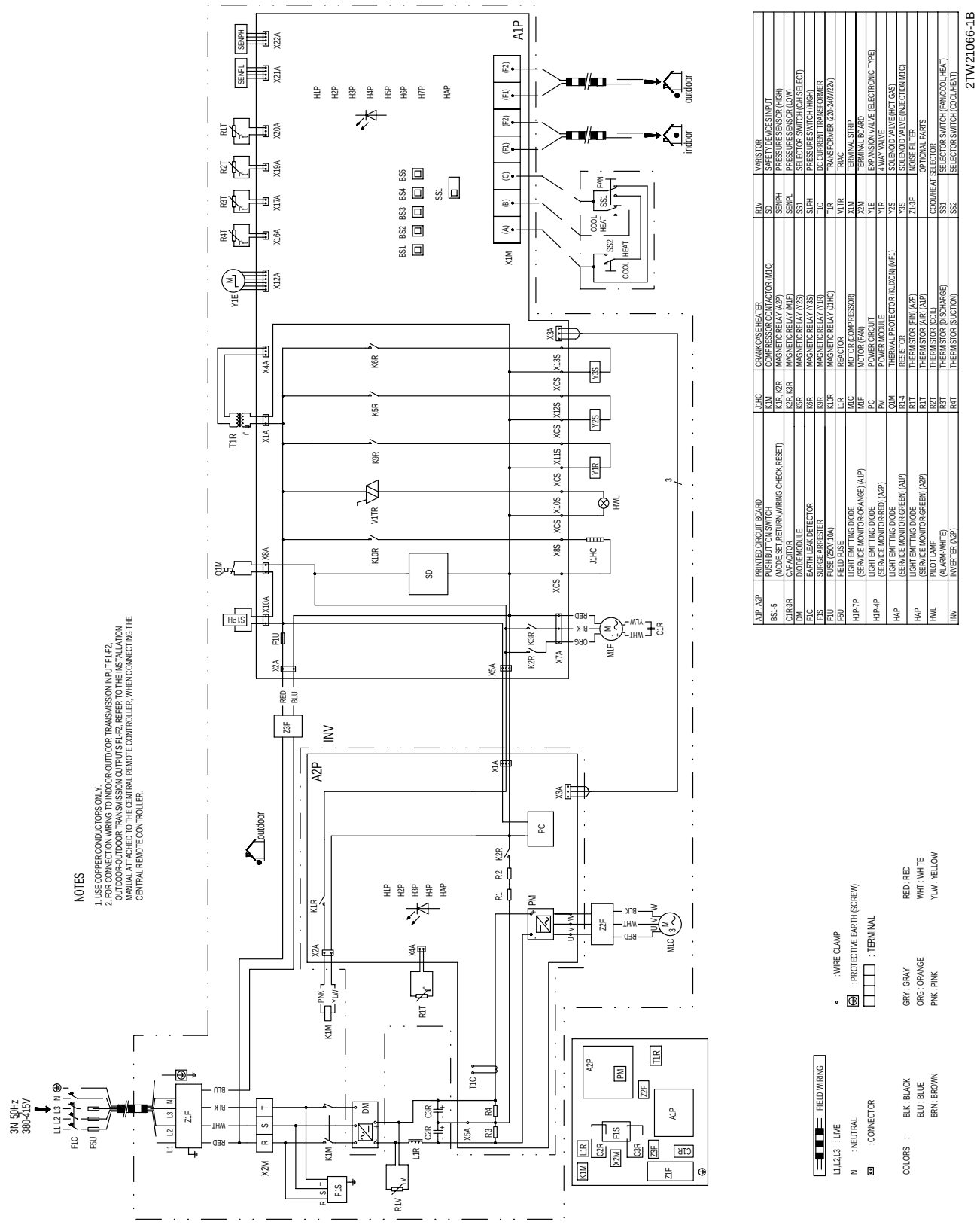
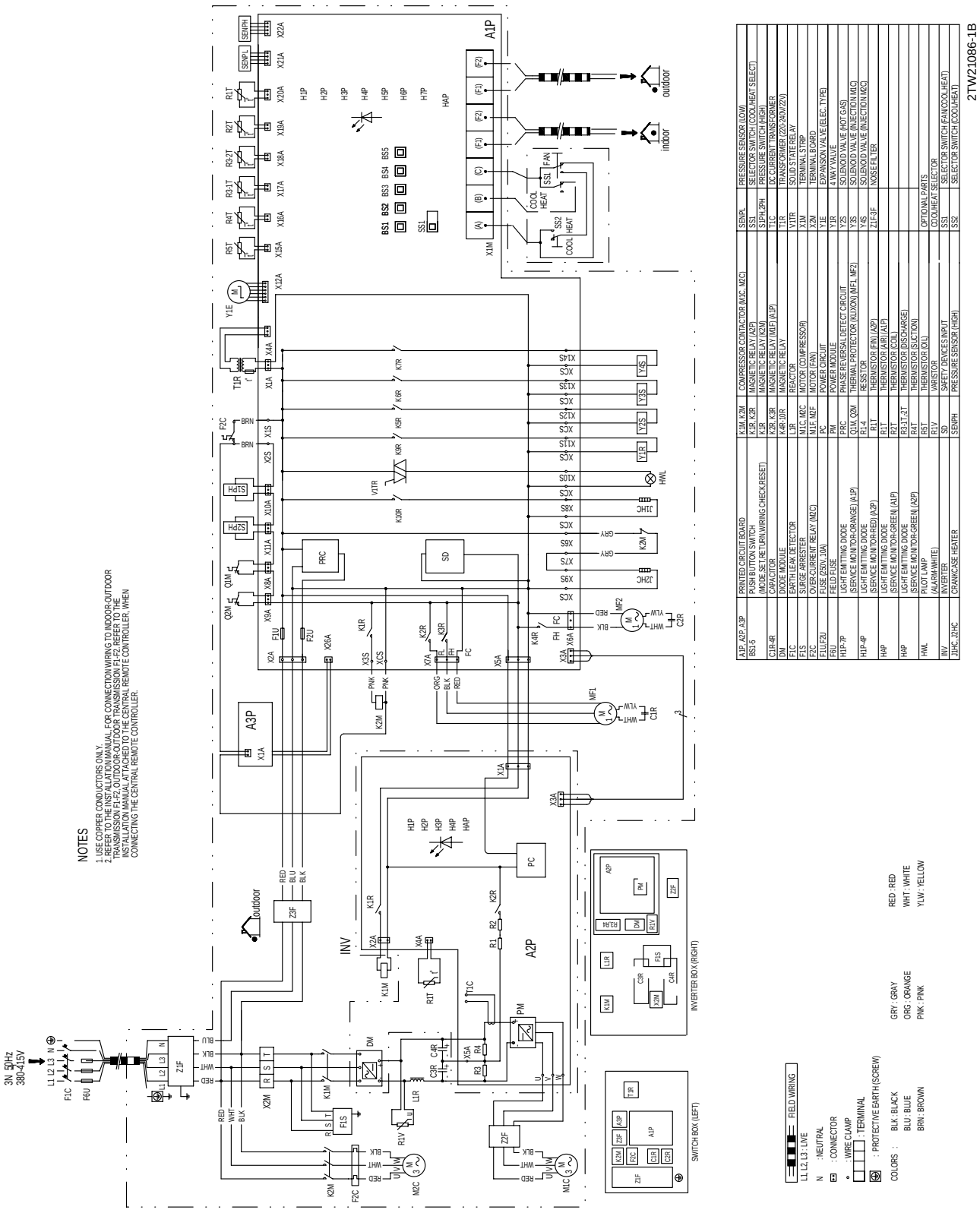
1. Wiring Diagrams (Outdoor Unit)

1.1 MX1 Series

CU-5MX1SPE



CU-8·10MX1SPE



A1P, A2P, A3P	PRINTED CIRCUIT BOARD
BS1-5	PUSH BUTTON SWITCH (MODE SET, RETURN, WIRING CHECK, RESET)
C1R-4R	CAPACITOR
DM	DIODE MODULE
F1C	EARTH LEAK DETECTOR
F1S	SURGE ARRESTER
F2C	OVER-CURRENT RELAY (M2C)
F1U, F2U	FUSE (250V, 10A)
F6U	FUSE (250V, 3.15A)
H1P-7P	LIGHT EMITTING DIODE (SERVICE MONITOR-ORANGE) (A1P)
H1P-4P	LIGHT EMITTING DIODE (SERVICE MONITOR-RED) (A2P)
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN) (A1P)
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN) (A2P)
HWL	PILOT LAMP (ALARM-WHITE)
INV	INVERTER
J3HC, J2HC	CRANKCASE HEATER

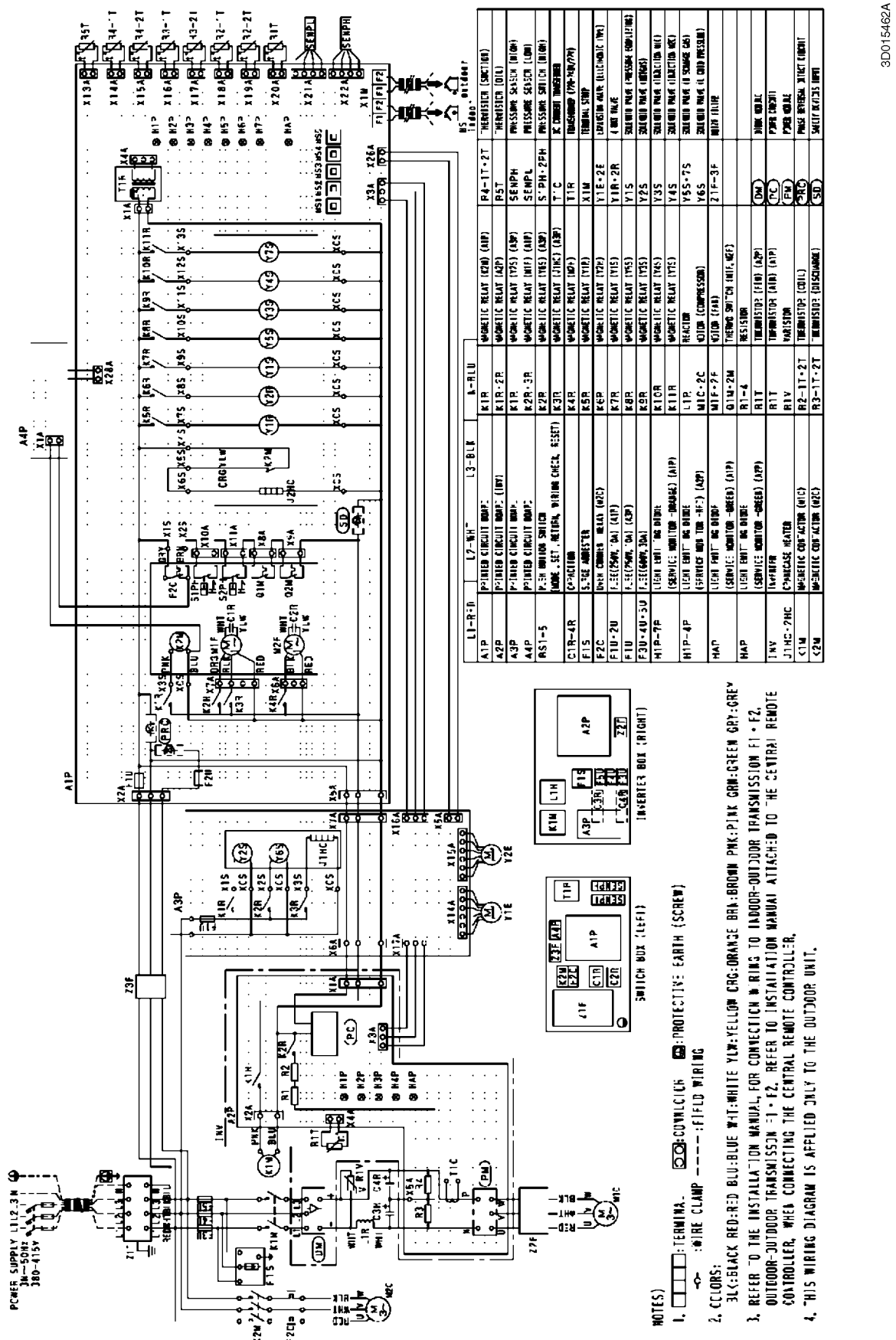
K1M, K2M	COMPRESSOR CONTACTOR (M1C, M2C)
K1R, K2R	MAGNETIC RELAY (A2P)
K3R	MAGNETIC RELAY (K2M)
K2R, K3R	MAGNETIC RELAY (MF1) (A1P)
K4R-10R	MAGNETIC RELAY
L1R	REACTOR
M1C, M2C	MOTOR (COMPRESSOR)
M1F, M2F	MOTOR (FAN)
PC	POWER CIRCUIT
PM	POWER MODULE
PRC	PHASE REVERSAL DETECT CIRCUIT
Q1M	THERMAL PROTECTOR (KUKON) (MF1, MF2)
R1-4	RESISTOR
R1T	THERMISTOR (FIN) (A2P)
R1T	THERMISTOR (AIR) (A1P)
R2T	THERMISTOR (COIL)
R3-1T, 2T	THERMISTOR (DISCHARGE)
R4T	THERMISTOR (SUCTION)
R5T	THERMISTOR (OIL)
R1V	VARISTOR
SD	SAFETY DEVICES INPUT
SEN1PH	PRESSURE SENSOR (HIGH)

SEN1PL	PRESSURE SENSOR (LOW)
SS1	SELECTOR SWITCH (COOL/HEAT SELECT)
S1PH, 2PH	PRESSURE SWITCH (HIGH)
T1C	DC CURRENT TRANSFORMER
T1R	TRANSFORMER (220-240V/22V)
V1TR	SOLID STATE RELAY
X1M	TERMINAL STRIP
X2M	TERMINAL BOARD
Y1E	EXPANSION VALVE (ELEC. TYPE)
Y1S	SOLENOID VALVE (HOT GAS)
Y2S	SOLENOID VALVE (INJECTION M1C)
Y3S	SOLENOID VALVE (INJECTION M2C)
Y4S	NOISE FILTER
Z1F-3F	
	OPTIONAL PARTS
	COOL/HEAT SELECTOR
SS1	SELECTOR SWITCH (FAN/COOL/HEAT)
SS2	SELECTOR SWITCH (COOL/HEAT)

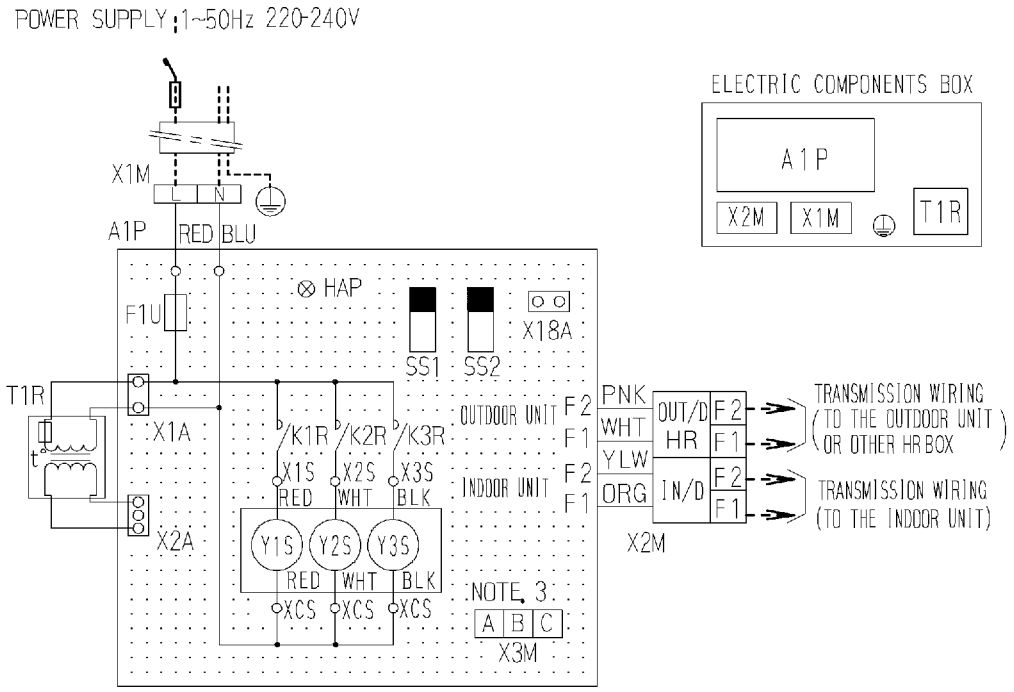
2TW21086-1B

1.2 ME1 Series (Heat Recovery)

CU-8·10ME1XPA

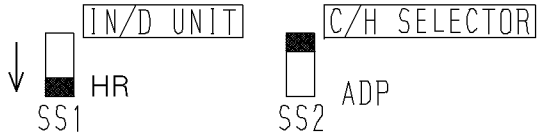

3D015462A
NOTES)
1. □□□: TERMINA. ⊡⊡: CONNECTOR ⏚: PROTECTIVE EARTH (SCREW)
: WIRE CLAMP ----- : FIELD WIRING
2. COLORS:
BLK:BLACK RED:RED BLU:BLUE WHT:WHITE YLW:YELLOW ORG:ORANGE BRN:BROWN PNK:PINK GRN:GREEN GRY:GREY
3. REFER TO THE INSTALLATION MANUAL, FOR CONNECTION WIRING TO INDOOR-OUTDOOR TRANSMISSION F1・F2.
OUTDOOR-OUTDOOR TRANSMISSION F1・F2, REFER TO INSTALLATION MANUAL ATTACHED TO THE CENTRAL REMOTE CONTROLLER, WHEN CONNECTING THE CENTRAL REMOTE CONTROLLER.
4. THIS WIRING DIAGRAM IS APPLIED ONLY TO THE OUTDOOR UNIT.
POWER SUPPLY L1/L2/L3/N 1N~50Hz 380-415V
SWITCH BOX (LEFT)
INVERTER BOX (RIGHT)
A1P
A2P
A3P
A4P
A3P
A1P
A2P
L1H
K1M
F1S
Z1F
Z2F
Z3F
Y1E
Y2E
T1P
T1C
T1R
R1
R2
R17
R1V
C3H
C4R
C1H
C2H
C1M
C2M
K1R
K2R
K3R
K4R
K5R
K6P
K7R
K8R
K9R
K10R
K11R
K12R

CZ-100·160HR1HE



A1P	PRINTED CIRCUIT BOARD	X1M	TERMINAL STRIP(POWER)
F1U	FUSE(250V, 5A)	X2M	TERMINAL STRIP(CONTROL)
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN)	X3M	TERMINAL STRIP(C/H SELECTOR)
		Y1S	SOLENOID VALVE(LIQUID LINE)
K1R-3R	MAGNETIC RELAY	Y2S	SOLENOID VALVE(SUCTION LINE)
SS1·2	SELECTOR SWITCH (SELECTION OF REMOTE CONTROLLER)	Y3S	SOLENOID VALVE(DISCHARGE LINE)
		CONNECTOR FOR OPTIONAL PARTS	
T1R	TRANSFORMER(220-240V/22V)	X18A	CONNECTOR(WIRING EXTERNAL CONTROL ADAPTOR FOR OUTDOOR UNIT)
L:RED	N:BLUE		

NOTES) 1. □□□: TERMINAL, ⊡⊡: CONNECTOR, —○— : WIRE CLAMP
2. ---- : FIELD WIRING
3. WHEN USING THE COOL/HEAT SELECTOR(OPTIONAL ACCESSORY), CONNECT IT TO TERMINALS A, B AND C ON THE A1P. IN THIS CASE, SET THE SELECTOR SWITCH SS1&SS2 ON THE A1P ACCORDING TO BELOW DRAWING.

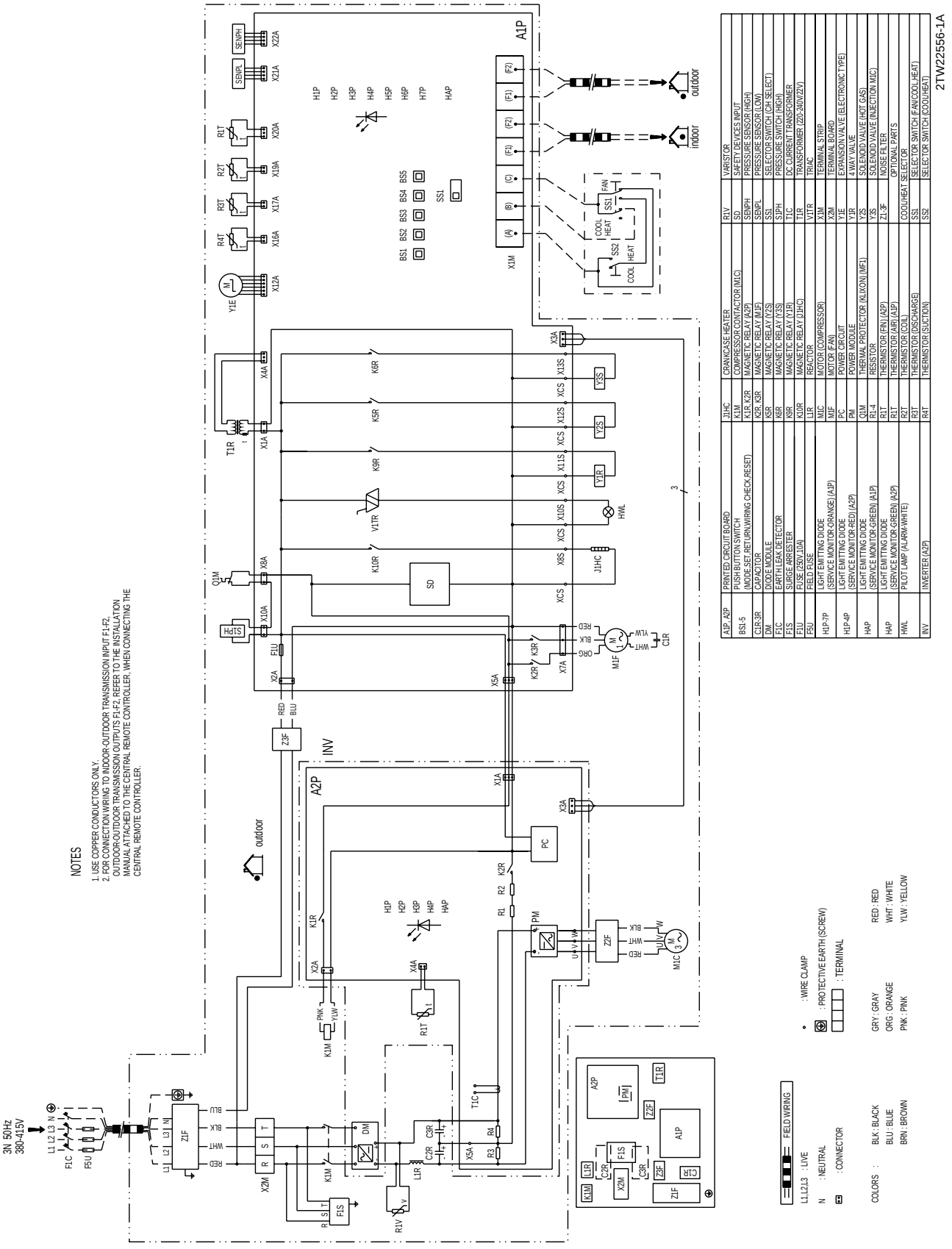


4. AS FOR WIRING TO THE IN/D F1&F2 AND OUT/D, HR F1&F2, REFER TO INSTALLATION MANUAL.
5. THIS WIRING DIAGRAM APPLIES TO THE HR BOX ONLY.
6. SYMBOLS SHOW AS FOLLOWS.
(BLU:BLUE ORG:ORANGE PNK:PINK RED:RED
WHT:WHITE YLW:YELLOW BLK:BLACK)
7. USE COPPER CONDUCTORS ONLY.

3D014829A

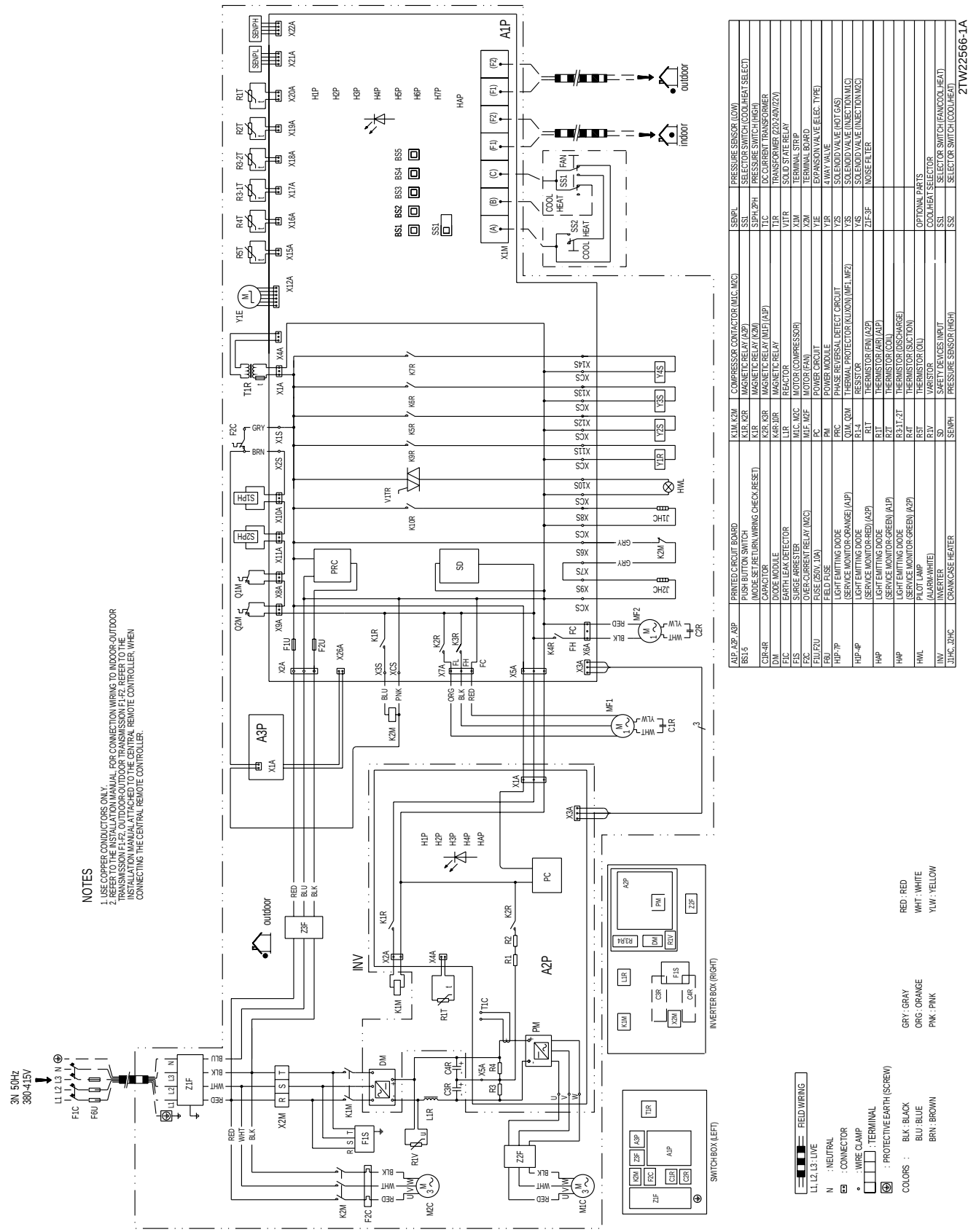
1.3 MX1R Series

CU-5MX1SPP



A1P, A2P	PRINTED CIRCUIT BOARD
BS1-5	PUSH BUTTON SWITCH (MODE,SET,RETURN,WIRING CHECK,RESET)
C1R-3R	CAPACITOR
DM	DIODE MODULE
F1C	EARTH LEAK DETECTOR
F1S	SURGE ARRESTER
F1U	FUSE (250V,10A)
F5U	FIELD FUSE
H1P-7P	LIGHT EMITTING DIODE (SERVICE MONITOR-ORANGE) (A1P)
H1P-4P	LIGHT EMITTING DIODE (SERVICE MONITOR-RED) (A2P)
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN) (A1P)
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN) (A2P)
HWL	PILOT LAMP (ALARM-WHITE)
INV	INVERTER (A2P)
J1HC	CRANKCASE HEATER
K1M	COMPRESSOR CONTACTOR (M1C)
K1R, K2R	MAGNETIC RELAY (A2P)
K2R, K3R	MAGNETIC RELAY (M1F)
K5R	MAGNETIC RELAY (Y2S)
K6R	MAGNETIC RELAY (Y3S)
K9R	MAGNETIC RELAY (Y1R)
K10R	MAGNETIC RELAY (J1HC)
L1R	REACTOR
M1C	MOTOR (COMPRESSOR)
M1F	MOTOR (F.FAN)
PC	POWER CIRCUIT
PM	POWER MODULE
Q1M	THERMAL PROTECTOR (KLIXON) (MF1)
R1-4	RESISTOR
R1T	THERMISTOR (FIN) (A2P)
R1T	THERMISTOR (AIR) (A1P)
R2T	THERMISTOR (COIL)
R3T	THERMISTOR (DISCHARGE)
R4T	THERMISTOR (SUCTION)
R1V	VARISTOR
SD	SAFETY DEVICES INPUT
SENPH	PRESSURE SENSOR (HIGH)
SENPL	PRESSURE SENSOR (LOW)
SS1	SELECTOR SWITCH (CH SELECT)
S1PH	PRESSURE SWITCH (HIGH)
T1C	DC CURRENT TRANSFORMER
T1R	TRANSFORMER (220-240V/22V)
V1TR	TRIAC
X1M	TERMINAL STRIP
X2M	TERMINAL BOARD
Y1E	EXPANSION VALVE (ELECTRONIC TYPE)
Y1R	4 WAY VALVE
Y2S	SOLENOID VALVE (HOT GAS)
Y3S	SOLENOID VALVE (INJECTION MIC)
Z1-3F	NOISE FILTER
	OPTIONAL PARTS
	COOL/HEAT SELECTOR
SS1	SELECTOR SWITCH (F.FAN/COOL,HEAT)
SS2	SELECTOR SWITCH (COOL/HEAT)

CU-8·10MX1SPP



A1P, A2P, A3P	PRINTED CIRCUIT BOARD
BS1-5	PUSH BUTTON SWITCH (MODE SET RETURN, WIRING CHECK, RESET)
C1R-4R	CAPACITOR
DM	DIODE MODULE
F1C	EARTH LEAK DETECTOR
F1S	SURGE ARRESTER
F2C	OVER-CURRENT RELAY (M2C)
F1U,F2U	FUSE (250V, 10A)
FBU	FIELD FUSE
H1P~7P	LIGHT EMITTING DIODE (SERVICE MONITOR-ORANGE) (A1P)
H1P~4P	LIGHT EMITTING DIODE (SERVICE MONITOR-RED) (A2P)
H4P	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN) (A1P)
H4P	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN) (A2P)
HWL	PILOT LAMP (ALARM-WHITE)
INV	INVERTER
1IHC, 2IHC	CRANKCASE HEATER

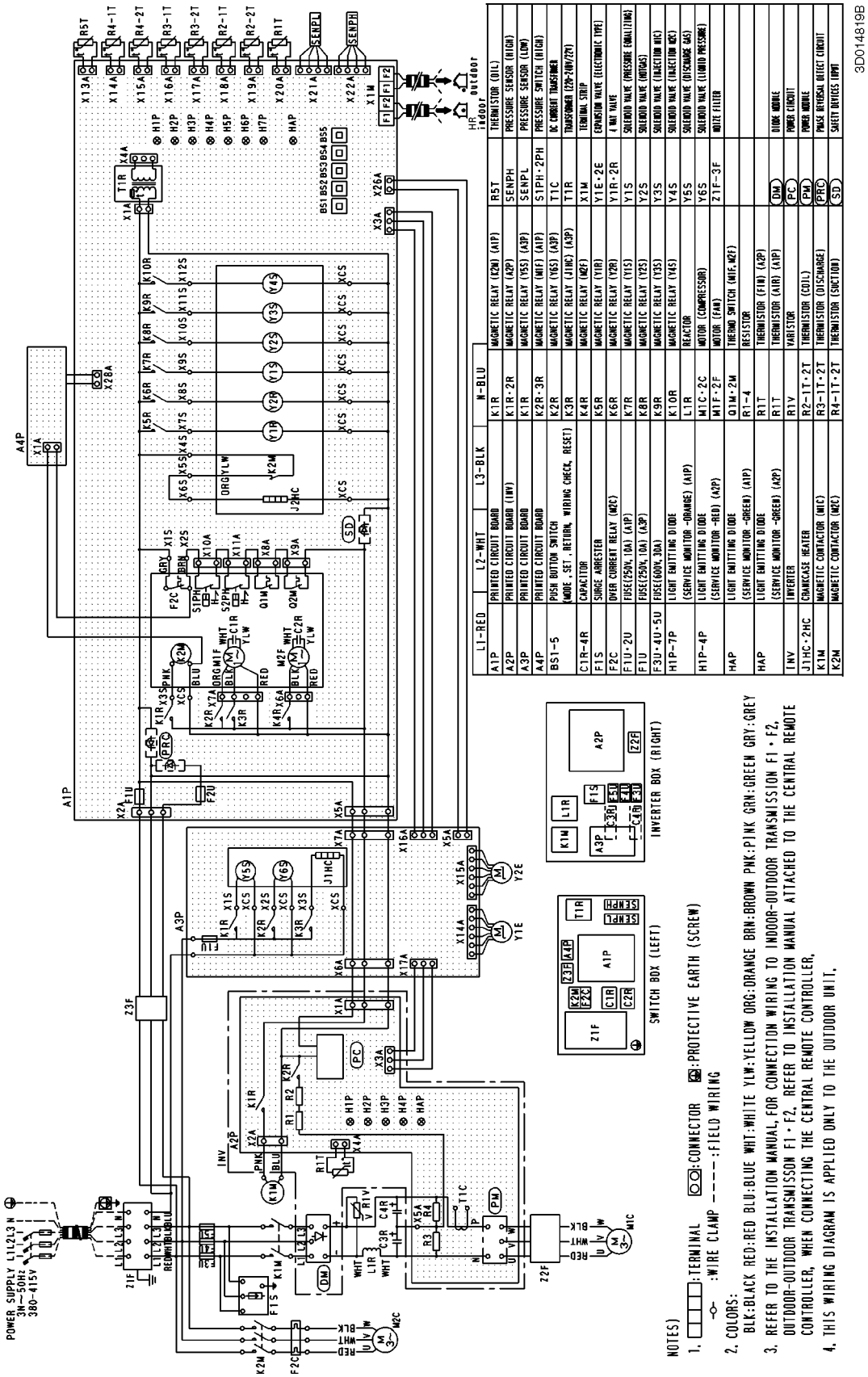
K1M, K2M	COMPRESSOR CONTACTOR (M1C, M2C)
K1R, K2R	MAGNETIC RELAY (A2P)
K1R	MAGNETIC RELAY (K2M)
K2R, K3R	MAGNETIC RELAY (M1F) (A1P)
K4R-10R	MAGNETIC RELAY
L1R	REACTOR
M1C, M2C	MOTOR (COMPRESSOR)
M1F, M2F	MOTOR (FAN)
PC	POWER CIRCUIT
PM	POWER MODULE
PRC	PHASE REVERSAL DETECT CIRCUIT
Q1M, Q2M	THERMAL PROTECTOR (KUKON) (MF1, MF2)
R1-4	RESISTOR
R1T	THERMISTOR (FIN) (A2P)
R1T	THERMISTOR (AIR) (A1P)
R2T	THERMISTOR (COIL)
R3-1T, 2T	THERMISTOR (DISCHARGE)
R4T	THERMISTOR (SUCTION)
RST	THERMISTOR (OIL)
R1V	VARISTOR
SD	SAFETY DEVICES INPUT
SENPH	PRESSURE SENSOR (HIGH)

SENPI	PRESSURE SENSOR (LOW)
SS1	SELECTOR SWITCH (COOL/HEAT SELECT)
S1PH, 2PH	PRESSURE SWITCH (HIGH)
T1C	DC CURRENT TRANSFORMER
T1R	TRANSFORMER (220-240V/22V)
V1TR	SOLID STATE RELAY
X1M	TERMINAL STRIP
X2M	TERMINAL BOARD
Y1E	EXPANSION VALVE (ELEC. TYPE)
Y1R	4 WAY VALVE
Y2S	SOLENOID VALVE (HOT GAS)
Y3S	SOLENOID VALVE (INJECTION M1C)
Y4S	SOLENOID VALVE (INJECTION M2C)
Z1F-3F	NOISE FILTER
	OPTIONAL PARTS
	COOL/HEAT SELECTOR
SS1	SELECTOR SWITCH (FAN/COOL-HEAT)
SS2	SELECTOR SWITCH (COOL/HEAT)

2TW22566-1A

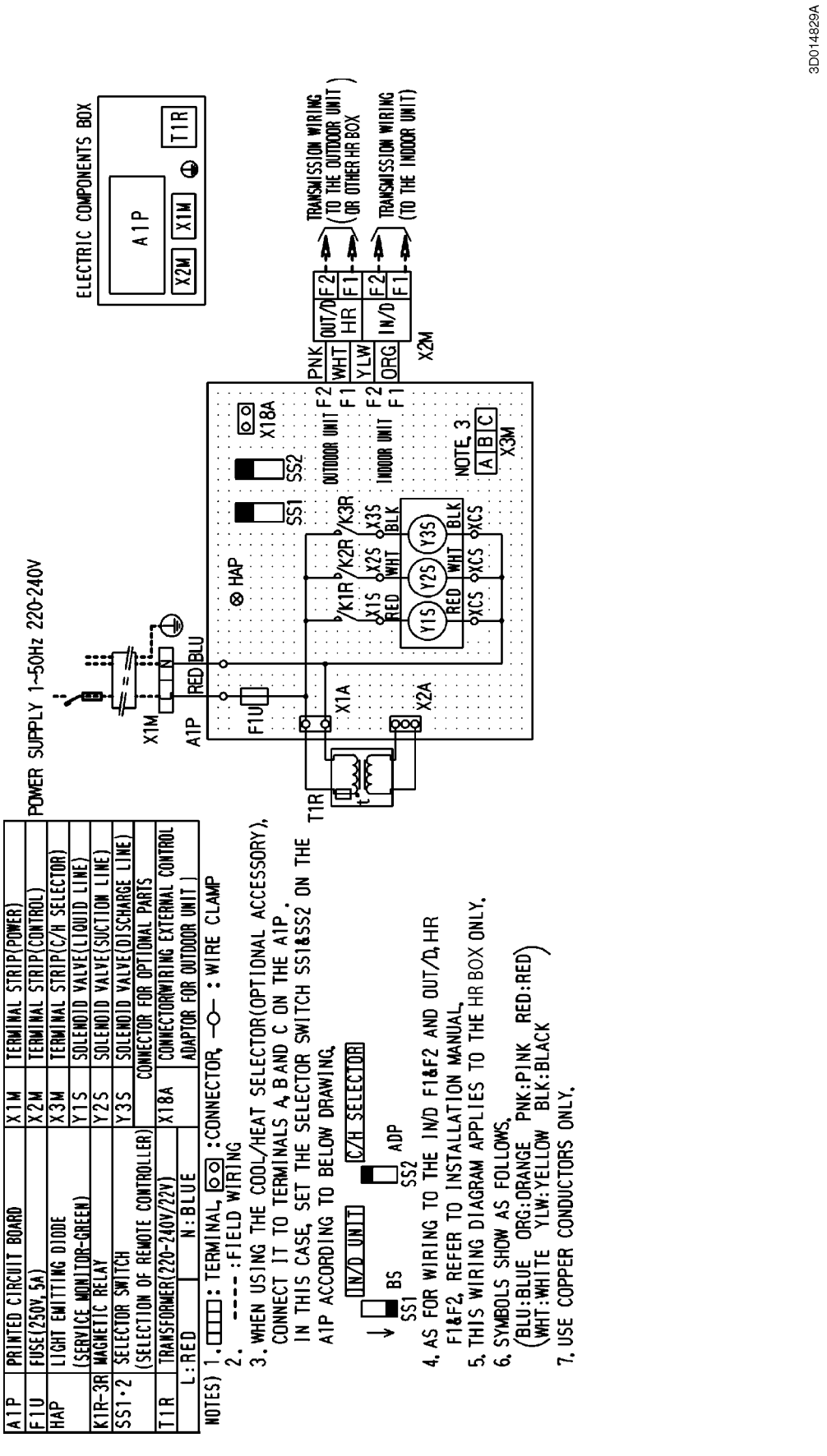
1.4 ME1R Series (Heat Recovery)

CU-8·10ME1XPK


3D014819B
POWER SUPPLY L1L2L3 N 3N~50Hz 380-415V
INVERTER BOX (RIGHT)
SWITCH BOX (LEFT)
NOTES)
1. □□□□:TERMINAL ⊙⊙:CONNECTOR ⊠:PROTECTIVE EARTH (SCREW)
:WIRE CLAMP ----:FIELD WIRING
2. COLORS:
BLK:BLACK RED:RED BLU:BLUE WHT:WHITE YLW:YELLOW ORG:ORANGE BRN:BROWN PNK:PINK GRN:GREEN GRY:GREY
3. REFER TO THE INSTALLATION MANUAL FOR CONNECTION WIRING TO INDOOR-OUTDOOR TRANSMISSION F1・F2, OUTDOOR-OUTDOOR TRANSMISSION F1・F2, REFER TO INSTALLATION MANUAL ATTACHED TO THE CENTRAL REMOTE CONTROLLER, WHEN CONNECTING THE CENTRAL REMOTE CONTROLLER,
4. THIS WIRING DIAGRAM IS APPLIED ONLY TO THE OUTDOOR UNIT.

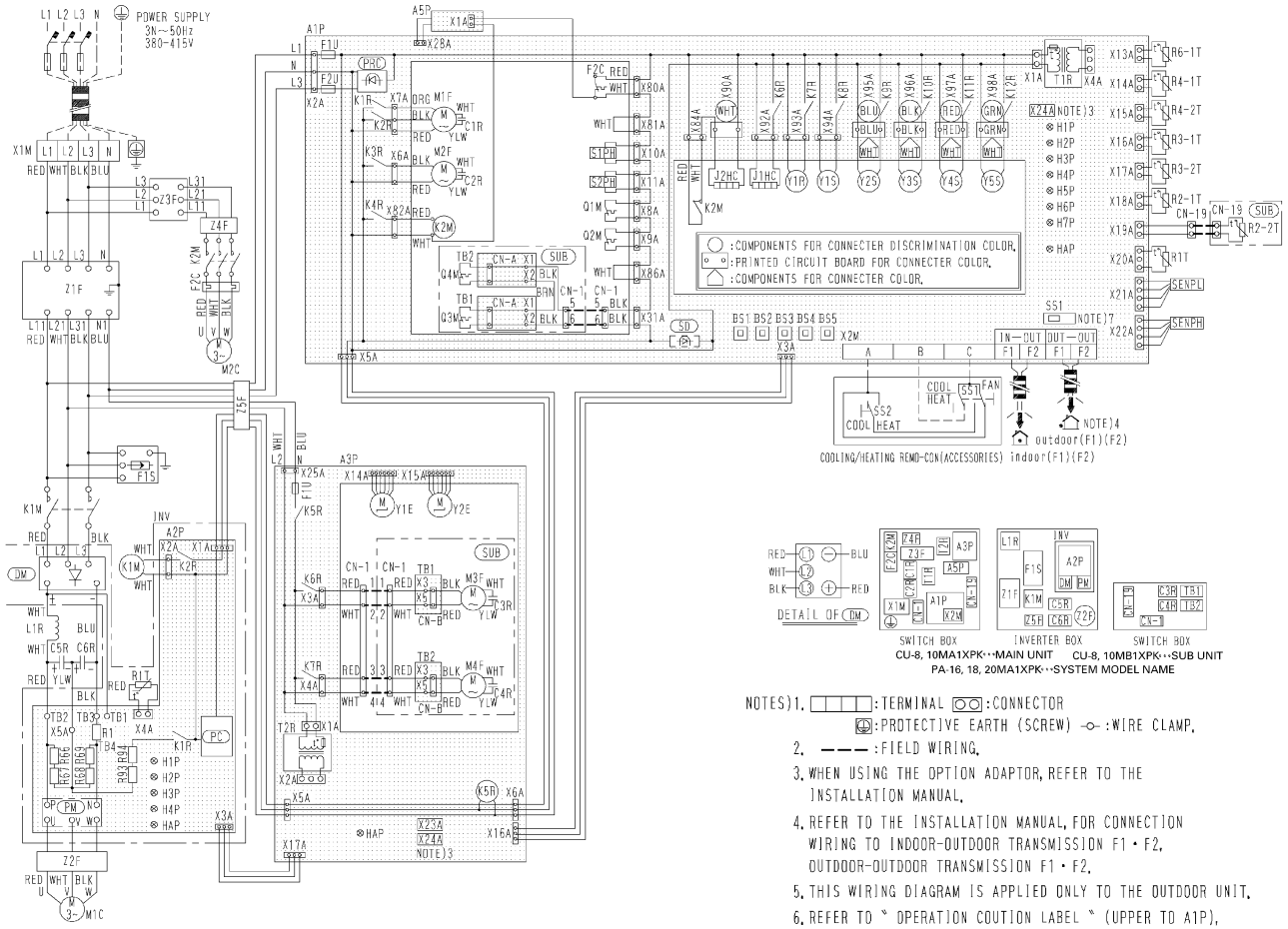
L1-RED	L2-WHT	L3-BLK	N-BLU		
A1P	PRINTED CIRCUIT BOARD		K1R	MAGNETIC RELAY (K2M) (A1P)	R5T	THERMISTOR (OIL)
A2P	PRINTED CIRCUIT BOARD (INV)		K1R-2R	MAGNETIC RELAY (A2P)	SENPH	PRESSURE SENSOR (HIGH)
A3P	PRINTED CIRCUIT BOARD		K1R	MAGNETIC RELAY (Y5S) (A3P)	SENPL	PRESSURE SENSOR (LOW)
A4P	PRINTED CIRCUIT BOARD		K2R-3R	MAGNETIC RELAY (Y4S) (A1P)	S1PH,2PH	PRESSURE SWITCH (HIGH)
BS1~5	PUSH BUTTON SWITCH (MODE, SET, RETURN, WIRING CHECK, RESET)		K2R	MAGNETIC RELAY (Y6S) (A3P)	T1C	DC CURRENT TRANSFORMER
			K3R	MAGNETIC RELAY (J1HC) (A3P)	T1R	TRANSFORMER (220-240V/22V)
C1R-4R	CAPACITOR		K4R	MAGNETIC RELAY (M2F)	X1M	TERMINAL STRIP
F1S	SURGE ARRESTER		K5R	MAGNETIC RELAY (Y1R)	Y1E・2E	EXPANSION VALVE (ELECTRONIC TYPE)
F2C	OVER CURRENT RELAY (M2C)		K6R	MAGNETIC RELAY (Y2R)	Y1R・2R	4 WAY VALVE
F1U・2U	FUSE(250V, 10A) (A1P)		K7R	MAGNETIC RELAY (Y1S)	Y1S	SOLENOID VALVE (PRESSURE EQUALIZING)
F1U	FUSE(250V, 10A) (A3P)		K8R	MAGNETIC RELAY (Y2S)	Y2S	SOLENOID VALVE (HOTGAS)
F3U・4U・5U	FUSE(600V, 30A)		K9R	MAGNETIC RELAY (Y3S)	Y3S	SOLENOID VALVE (INJECTION MIC)
H1P~7P	LIGHT EMITTING DIODE (SERVICE MONITOR -ORANGE) (A1P)		K10R	MAGNETIC RELAY (Y4S)	Y4S	SOLENOID VALVE (INJECTION MIC)
			L1R	REACTOR	Y5S	SOLENOID VALVE (DISCHARGE GAS)
H1P~4P	LIGHT EMITTING DIODE (SERVICE MONITOR -RED) (A2P)		M1C・2C	MOTOR (COMPRESSOR)	Y6S	SOLENOID VALVE (LIQUID PRESSURE)
			M1F・2F	MOTOR (FAN)	Z1F~3F	NOISE FILTER
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR -GREEN) (A1P)		Q1M・2M	THERMO SWITCH (M1F, M2F)		
			R1~4	RESISTOR		
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR -GREEN) (A2P)		R1T	THERMISTOR (FIN) (A2P)		
			R1T	THERMISTOR (AIR) (A1P)	DM	DRAIN HEATER
INV	INVERTER		R1V	VARISTOR	PC	POWER CIRCUIT
J1HC・2HC	CRANKCASE HEATER		R2-1T・2T	THERMISTOR (COIL)	PM	POWER MODULE
K1M	MAGNETIC CONTACTOR (M1C)		R3-1T・2T	THERMISTOR (DISCHARGE)	PRC	PHASE REVERSAL DETECT CIRCUIT
K2M	MAGNETIC CONTACTOR (M2C)		R4-1T・2T	THERMISTOR (SUCTION)	SD	SAFETY DEVICES (FPH)

CZ-100·160HR1HP



1.5 MA1R Series (Combination)

PA-16·18·20MA1XPK



NOTES)1. □□□□:TERMINAL ⊙⊙:CONNECTOR
⏚:PROTECTIVE EARTH (SCREW) -o- :WIRE CLAMP.
2. ———:FIELD WIRING.
3. WHEN USING THE OPTION ADAPTOR, REFER TO THE INSTALLATION MANUAL.
4. REFER TO THE INSTALLATION MANUAL, FOR CONNECTION WIRING TO INDOOR-OUTDOOR TRANSMISSION F1・F2, OUTDOOR-OUTDOOR TRANSMISSION F1・F2.
5. THIS WIRING DIAGRAM IS APPLIED ONLY TO THE OUTDOOR UNIT.
6. REFER TO " OPERATION COUTION LABEL " (UPPER TO A1P), HOW TO USE BS1～BS5 SWITCH.
7. SET UP OF SS1
① THE CASE WHICH SET UP FROM REMOTE CONTROLLER, TURN SS1 SWITCH TO IN/D SIDE (SS1 SWITCH TO IN/D SIDE ON SHIPMENT)
② THE CASE WHICH SET UP FROM COOL/HEAT SELECTER, TURE SS1 SWITCH TO OUT/D SIDE.
8. WHEN OPERATING, DON'T SHORT CIRCUIT FOR PROTECTION DEVICE. (F2C・Q1M～4M・S1PH/2PH)
9. COLORS BLK:BLACK RED:RED BLU:BLUE WHT:WHITE YLW:YELLOW ORG:ORANGE BRN:BROWN GRN:GREEN.

L1-RED	L2-WHT	L3-BLK	N-BLU

A1P	PRINTED CIRCUIT BOARD(MAIN)	K4R	MAGNETIC CONTACTOR(K2M)(A1P)	SENPH	PRESSURE SENSOR (HIGH)
A2P	PRINTED CIRCUIT BOARD (INV)	K5R	MAGNETIC CONTACTOR(A3P)	SENPL	PRESSURE SENSOR (LOW)
A3P	PRINTED CIRCUIT BOARD (SUB)	K6R	MAGNETIC CONTACTOR(J1HC)(A1P)	S1PH・2PH	PRESSURE SWITCH (HIGH)
A5P	PRINTED CIRCUIT BOARD	K6R	MAGNETIC CONTACTOR(M3F)(A3P)	TB1・2	TERMINAL CIRCUIT BOARD(RELAY)
BS1～5	PUSH BUTTON SWITCH (MODE, SET, RETURN, WIRING CHECK, RESET)	K7R	MAGNETIC CONTACTOR(Y1R)(A1P)	T1R・2R	TRANSFORMER (220-240V/22V)
		K7R	MAGNETIC CONTACTOR(M4F)(A3P)	X1M	TERMINAL STRIP(POWER)
C1R～4R	CAPACITOR	K8R	MAGNETIC CONTACTOR(Y1S)(A1P)	X2M	TERMINAL STRIP(CONTROL)
C5R・6R	CAPACITOR	K9R	MAGNETIC CONTACTOR(Y2S)(A1P)	Y1E・2E	ELECTRONIC EXPANSION VALVE
CN-1, CN-19	RELAYING CONNECTOR	K10R	MAGNETIC CONTACTOR(Y3S)(A1P)	Y1R	4 WAY VALVE
F2C	OVER CURRENT RELAY (M2C)	K11R	MAGNETIC CONTACTOR(Y4S)(A1P)	Y1S	SOLENOID VALVE (AUXILIARY CONDENSER)
F1S	SURGE ABSORBER	K12R	MAGNETIC CONTACTOR(Y5S)(A1P)	Y2S	SOLENOID VALVE (HOTGAS)
F1U・2U	FUSE(250V, 10A) (A1P)	L1R	REACTOR	Y3S	SOLENOID VALVE (INJECTION M1C)
F1U	FUSE(250V, 10A)(A3P)	M1C・2C	MOTOR (COMPRESSOR)	Y4S	SOLENOID VALVE (INJECTION M2C)
H1P～7P	PILOTLAMP(SERVICE MONITOR-ORANGE)(A1P) H2P:PREPARE—FLICKERING MALFUNCTION DETECTION—LIGHT UP	M1F・2F	MOTOR (FAN)	Y5S	SOLENOID VALVE (RECEIVER)
		M3F・4F	MOTOR (FAN)	Z1F～5F	NOISE FILTER
		Q1M・2M	THERMO SWITCH (M1F, M2F)		
H1P～4P	PILOTLAMP(SERVICE MONITOR-RED)(A2P)	Q3M・4M	THERMO SWITCH (M3F, M4F)	(DM)	DIODE MODULE
HAP	PILOTLAMP(SERVICE MONITOR-GREEN)(A1P~3P)	R1	RESISTOR	(PC)	POWER CIRCUIT
INV	INVERTER	R66～69	RESISTOR	(PM)	POWER MODULE
J1HC・2HC	CRANKCASE HEATER	R93・94	RESISTOR	(PRC)	PHASE REVERSAL DETECT CIRCUIT
K1M・2M	MAGNETIC CONTACTOR(M1C・2C)	R1T	THERMISTOR (AIR) (A1P)	(SD)	SAFETY DEVICES INPUT
K1R	MAGNETIC CONTACTOR(M1F)(A1P)	R1T	THERMISTOR (FIN) (A2P)		
K1R	MAGNETIC CONTACTOR(A2P)	R2-1T・2T	THERMISTOR (COIL)	COOLING/HEATING REM-CON(KRC19-26)	
K2R	MAGNETIC CONTACTOR(M1F)(A1P)	R3-1T・2T	THERMISTOR (DISCHARGE)	SS1	SELECTOR SWITCH(FAN/COOL・HEAT)
K2R	MAGNETIC CONTACTOR(A2P)	R4-1T・2T	THERMISTOR (HEADER)	SS2	SELECTOR SWITCH(COOL/HEAT)
K3R	MAGNETIC CONTACTOR(M2F)(A1P)	R6-1T	THERMISTOR (SUCTION)		

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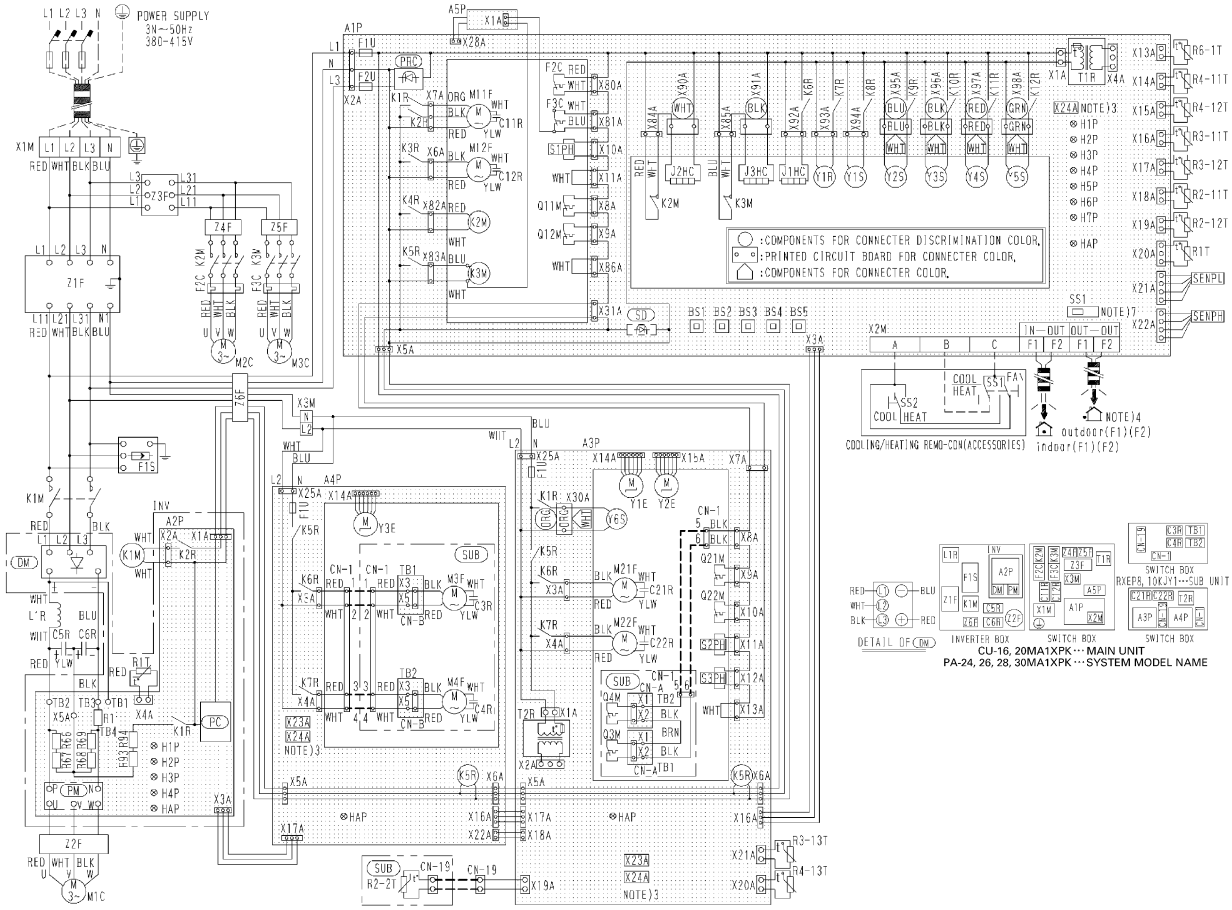
PA-24·26·28·30MA1XPK



NOTES)1. □□□□:TERMINAL ○○:CONNECTOR
⏚:PROTECTIVE EARTH (SCREW) -o-:WIRE CLAMP.
2. ———:FIELD WIRING.
3. WHEN USING THE OPTION ADAPTOR, REFER TO THE INSTALLATION MANUAL.
4. REFER TO THE INSTALLATION MANUAL FOR CONNECTION WIRING TO INDOOR-OUTDOOR TRANSMISSION F1・F2, OUTDOOR-OUTDOOR TRANSMISSION F1・F2.
5. THIS WIRING DIAGRAM IS APPLIED ONLY TO THE OUTDOOR UNIT.
6. REFER TO " OPERATION COUTION LABEL " (UPPER TO A1P), HOW TO USE BS1~BS5 SWITCH.
7. SET UP OF SS1
① THE CASE WHICH SET UP FROM REMOTE CONTROLLER. TURN SS1 SWITCH TO IN/D SIDE (SS1 SWITCH TO IN/D SIDE ON SHIPMENT)
② THE CASE WHICH SET UP FROM COOL/HEAT SELECTER. TURE SS1 SWITCH TO OUT/D SIDE.
8. WHEN OPERATING, DON'T SHORT CIRCUIT FOR PROTECTION DEVICE. (F2C/3C・Q11M/12M/21M/22M・Q3M/4M・S1PH~3PH)
9. COLORS BLK:BLACK RED:RED BLU:BLUE WHT:WHITE YLW:YELLOW ORG:ORANGE BRN:BROWN GRN:GREEN.

L1-RED	L2-WHT	L3-BLK	N-BLU

A1P	PRINTED CIRCUIT BOARD(MAIN)	K4R	MAGNETIC CONTACTOR(K2M)(A1P)	R3-11T~13T	THERMISTOR (DISCHARGE)
A2P	PRINTED CIRCUIT BOARD (INV)	K5R	MAGNETIC CONTACTOR(K3M)(A1P)	R4-11T~13T	THERMISTOR (HEADER)
A3P・4P	PRINTED CIRCUIT BOARD (SUB)	K5R	MAGNETIC CONTACTOR(A3P・A4P)	R6-1T	THERMISTOR (SUCTION)
A5P	PRINTED CIRCUIT BOARD	K6R	MAGNETIC CONTACTOR(J1HC)(A1P)	SENPH	PRESSURE SENSOR (HIGH)
BS1~5	PUSH BUTTON SWITCH (MODE, SET, RETURN, WIRING CHECK, RESET)	K6R	MAGNETIC CONTACTOR(M21F)(A3P)	SENPL	PRESSURE SENSOR (LOW)
		K6R	MAGNETIC CONTACTOR(M3F)(A4P)	S1PH~3PH	PRESSURE SWITCH (HIGH)
C11R・12R	CAPACITOR	K7R	MAGNETIC CONTACTOR(Y1R)(A1P)	TB1・2	TERMINAL CIRCUIT BOARD(RELAY)
C21R・22R	CAPACITOR	K7R	MAGNETIC CONTACTOR(M22F)(A3P)	T1R・2R	TRANSFORMER (220-240V/22V)
C3R・4R	CAPACITOR	K8R	MAGNETIC CONTACTOR(M4F)(A4P)	X1M	TERMINAL STRIP(POWER)
C5R・6R	CAPACITOR	K8R	MAGNETIC CONTACTOR(Y1S)(A1P)	X2M	TERMINAL STRIP(CONTROL)
CN-1, CN-19	RELAYING CONNECTOR	K9R	MAGNETIC CONTACTOR(Y2S)(A1P)	X3M	TERMINAL STRIP(RELAY)
F1S	SURGE ABSORBER	K10R	MAGNETIC CONTACTOR(Y3S)(A1P)	Y1E~3E	ELECTRONIC EXPANSION VALVE
F2C・3C	OVER CURRENT RELAY (M2C・3C)	K11R	MAGNETIC CONTACTOR(Y4S)(A1P)	Y1R	4 WAY VALVE
F1U・2U	FUSE(250V, 10A) (A1P)	K12R	MAGNETIC CONTACTOR(Y5S)(A1P)	Y1S	SOLENOID VALVE (AUXILIARY CONDENSER)
F1U	FUSE(250V, 10A)(A3P・4P)	L1R	REACTOR	Y2S	SOLENOID VALVE (HOTGAS)
H1P~7P	PILOTLAMP(SERVICE MONITOR-ORANGE)(A1P) H2P:PREPARE-FLICKERING MALFUNCTION DETECTION-LIGHT UP	M1C~3C	MOTOR (COMPRESSOR)	Y3S	SOLENOID VALVE (INJECTION M1C)
		M11F・12F	MOTOR (FAN)	Y4S	SOLENOID VALVE (INJECTION M2C)
		M21F・22F	MOTOR (FAN)	Y5S	SOLENOID VALVE (RECEIVER)
H1P~4P	PILOTLAMP(SERVICE MONITOR-RED)(A2P)	M3F・4F	MOTOR (FAN)	Y6S	SOLENOID VALVE (INJECTION M3C)
HAP	PILOTLAMP(SERVICE MONITOR-GREEN)(A1P~4P)	Q11M・12M	THERMO SWITCH (M11F, M12F)	Z1F~6F	NOISE FILTER
INV	INVERTER	Q21M・22M	THERMO SWITCH (M21F, M22F)	DM	DIODE MODULE
J1HC~3C	CRANKCASE HEATER	Q3M・4M	THERMO SWITCH (M3F, M4F)	PC	POWER CIRCUIT
K1M~3M	MAGNETIC CONTACTOR(M1C・2C・3C)	R1	RESISTOR	PM	POWER MODULE
K1R	MAGNETIC CONTACTOR(M11F)(A1P)	R66~69	RESISTOR	PRC	PHASE REVERSAL DETECT CIRCUIT
K1R	MAGNETIC CONTACTOR(A2P)	R93・94	RESISTOR	SD	SAFETY DEVICES INPUT
K1R	MAGNETIC CONTACTOR(Y6S)(A3P)	R1T	THERMISTOR (AIR) (A1P)		
K2R	MAGNETIC CONTACTOR(M11F)(A1P)	R1T	THERMISTOR (FIN) (A2P)	COOLING/HEATING REM-CON(KRC19-26)	
K2R	MAGNETIC CONTACTOR(A2P)	R2-11T・12T	THERMISTOR (COIL)	SS1	SELECTOR SWITCH(FAN/COOL・HEAT)
K3R	MAGNETIC CONTACTOR(M12F)(A1P)	R2-2T	THERMISTOR (COIL)	SS2	SELECTOR SWITCH(COOL・HEAT)

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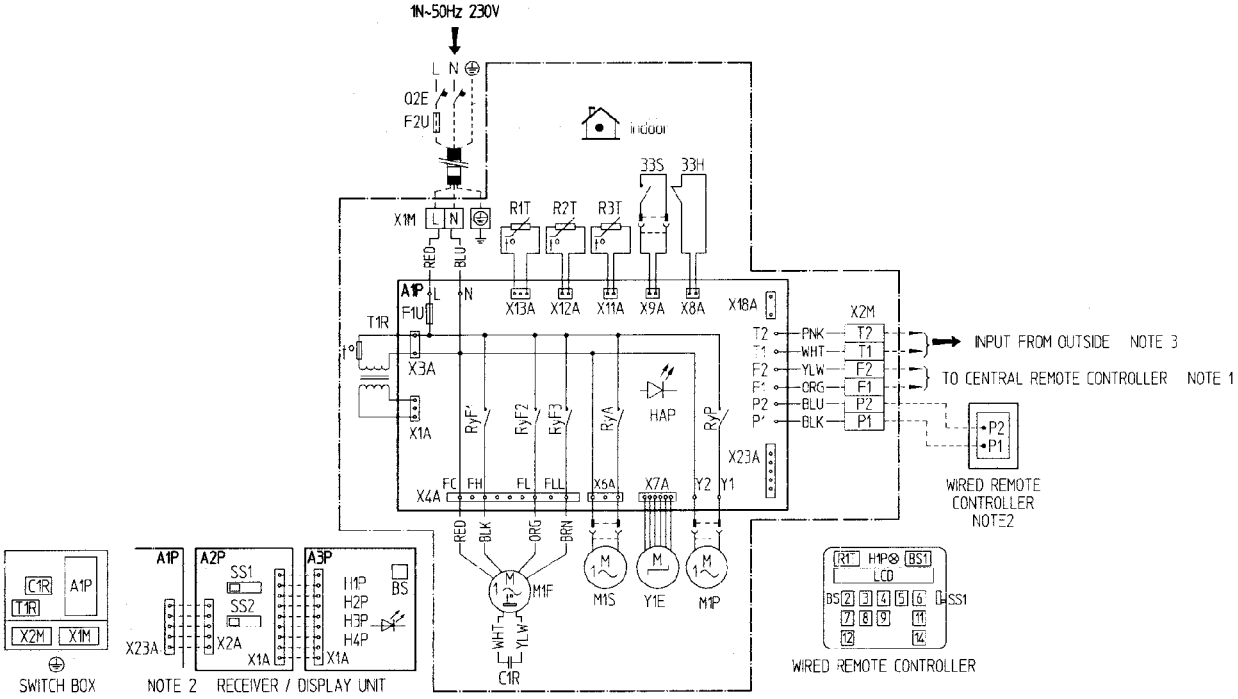
2. Wiring Diagrams (Indoor Unit)

2.1 2-Way Cassette Type

CS-20·25·32·63LMHPP



33H	FLOAT SWITCH	SS1	SELECTOR SWITCH (MAIN/SUB)
33S	LIMIT SWITCH (SWING FLAP)		WIRELESS REMOTE CONTROLLER
A1P	PRINTED CIRCUIT BOARD	BS1	ON/OFF BUTTON
C1R	CAPACITOR (M1F)	BS2	TIMER MODE START/STOP BUTTON
F1T	THERMAL FUSE (152°C) (M1F EMBEDDED)	BS3	FAN SPEED CONTROL BUTTON
F1U	FUSE (250V, 5A)	BS4	ADJUSTEMENT OF AIR FLOW DIRECTION
F2U	FIELD FUSE	BS5, BS6	TIME/TEMPERATURE SET BUTTON
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN)	BS8	INSPECTION/TEST OPERATION BUTTON
		BS10	OPERATION MODE SELECTOR BUTTON
M1F	MOTOR (INDOOR FAN)	BS12	FILTER SIGN RESET BUTTON
M1S	MOTOR (SWING FLAP)	BS13	TIMER ON BUTTON
M1P	MOTOR (DRAIN PUMP)	BS14	TIMER OFF BUTTON
R1T	THERMISTOR (AIR)	LCD	LIQUID CRYSTAL DISPLAY
R2T, R3T	THERMISTOR (COIL)	SS18	SELECTOR SWITCH (WIRELESS ADDRESS SET)
Q2E	EARTH LEAK DETECTOR		RECEIVER/DISPLAY UNIT (ATTACHED TO WIRELESS REMOTE CONTROLLER)
RyA	MAGNETIC RELAY (M1S)		
RyF1-3	MAGNETIC RELAY (M1F)	A2P, A3P	PRINTED CIRCUIT BOARD
RyP	MAGNETIC RELAY (M1P)	BS	ON/OFF BUTTON
T1R	TRANSFORMER (220-240V/22V)	H1P	LIGHT EMITTING DIODE (ON-RED)
X1M	TERMINAL STRIP (POWER)	H2P	LIGHT EMITTING DIODE (TIMER-GREEN)
X2M	TERMINAL STRIP (CONTROL)	H3P	LIGHT EMITTING DIODE (FILTER SIGN-RED)
Y1E	ELECTRONIC EXPANSION VALVE	H4P	LIGHT EMITTING DIODE (DEFROST-ORANGE)
	WIRED REMOTE CONTROLLER	SS1	SELECTOR SWITCH (MAIN/SUB)
BS1	ON/OFF BUTTON	SS2	SELECTOR SWITCH (WIRELESS ADDRESS SET)
BS2	TIMER MODE START/STOP BUTTON		CONNECTOR FOR OPTIONAL PARTS
BS3, BS8	PROGRAMMING TIME BUTTON	X18A	CONNECTOR (WIRING, ADAPTOR FOR ELECTRICAL APPENDICES)
BS4, BS9	TEMPERATURE SETTING BUTTON	X23A	CONNECTOR (WIRELESS REMOTE CONTROLLER)
BS5	ADJUSTEMENT OF AIR FLOW DIRECTION		
BS6	OPERATION MODE SELECTOR BUTTON		
BS7	TIMER ON/OFF BUTTON		
BS11	FAN SPEED CONTROL BUTTON		
BS12	INSPECTION/TEST OPERATION BUTTON		
BS14	FILTER SIGN RESET BUTTON		
H1P	LIGHT EMITTING DIODE (ON-RED)		
LCD	LIQUID CRYSTAL DISPLAY		
R1T	THERMISTOR (AIR)		

FIELD WIRING

L : LIVE
N : NEUTRAL
CONNECTOR
WIRE CLAMP
PROTECTIVE EARTH (SCREW)

COLORS :
BLK : BLACK PNK : PINK
BLU : BLUE RED : RED
BRN : BROWN WHT : WHITE
ORG : ORANGE YLW : YELLOW

NOTES :
1. WHEN USING A CENTRAL REMOTE CONTROLLER, SEE MANUAL FOR CONNECTION TO THE UNIT.
2. X23A IS CONNECTED WHEN THE WIRELESS REMOTE CONTROLLER KIT IS USED.
3. WHEN CONNECTING THE INPUT WIRES FROM THE OUTDOOR UNIT, "FORCED OFF" OR "ON/OFF" OPERATION CAN BE SELECTED BY THE REMOTE CONTROLLER. FOR MORE DETAILS SEE INSTALLATION MANUAL.
4. USE COPPER CONDUCTORS ONLY.

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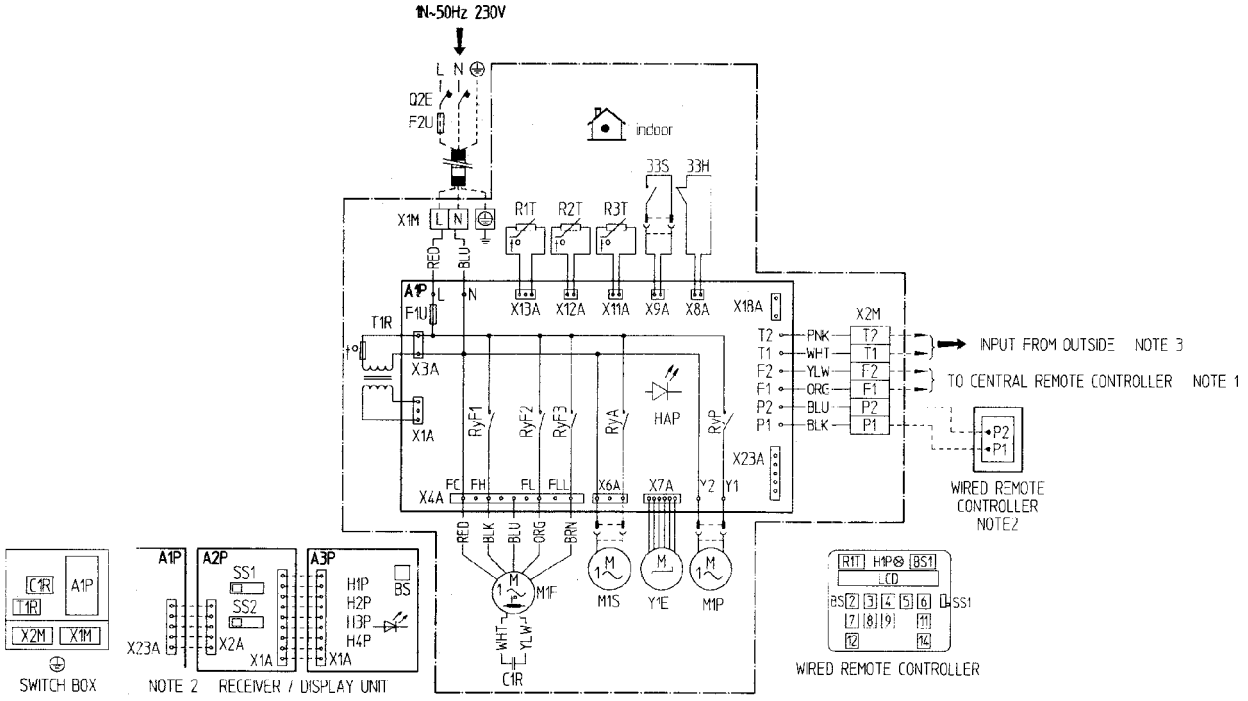
CS-40·50·80·125LMHPP



33H	FLOAT SWITCH	SS1	SELECTOR SWITCH (MAIN/SUB)
33S	LIMIT SWITCH (SWING FLAP)		WIRELESS REMOTE CONTROLLER
A1P	PRINTED CIRCUIT BOARD	BS1	ON/OFF BUTTON
C1R	CAPACITOR (M1F)	BS2	TIMER MODE START/STOP BUTTON
F1T	THERMAL FUSE (152°C) (M1F EMBEDDED)	BS3	FAN SPEED CONTROL BUTTON
F1U	FUSE (250V, 5A)	BS4	ADJUSTEMENT OF AIR FLOW DIRECTION
F2U	FIELD FUSE	BS5, BS6	TIME/TEMPERATURE SET BUTTON
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN)	BS8	INSPECTION/TEST OPERATION BUTTON
		BS10	OPERATION MODE SELECTOR BUTTON
M1F	MOTOR (INDOOR FAN)	BS12	FILTER SIGN RESET BUTTON
M1S	MOTOR (SWING FLAP)	BS13	TIMER ON BUTTON
M1P	MOTOR (DRAIN PUMP)	BS14	TIMER OFF BUTTON
R1T	THERMISTOR (AIR)	LCD	LIQUID CRYSTAL DISPLAY
R2T, R3T	THERMISTOR (COIL)	SS18	SELECTOR SWITCH (WIRELESS ADDRESS SET)
Q2E	EARTH LEAK DETECTOR		RECEIVER/DISPLAY UNIT (ATTACHED TO WIRELESS REMOTE CONTROLLER)
RyA	MAGNETIC RELAY (M1S)		
RyF1-3	MAGNETIC RELAY (M1F)	A2P, A3P	PRINTED CIRCUIT BOARD
RyP	MAGNETIC RELAY (M1P)	BS	ON/OFF BUTTON
T1R	TRANSFORMER (220-240V/22V)	H1P	LIGHT EMITTING DIODE (ON-RED)
X1M	TERMINAL STRIP (POWER)	H2P	LIGHT EMITTING DIODE (TIMER-GREEN)
X2M	TERMINAL STRIP (CONTROL)	H3P	LIGHT EMITTING DIODE (FILTER SIGN-RED)
Y1E	ELECTRONIC EXPANSION VALVE	H4P	LIGHT EMITTING DIODE (DEFROST-ORANGE)
	WIRED REMOTE CONTROLLER	SS1	SELECTOR SWITCH (MAIN/SUB)
BS1	ON/OFF BUTTON	SS2	SELECTOR SWITCH (WIRELESS ADDRESS SET)
BS2	TIMER MODE START/STOP BUTTON		CONNECTOR FOR OPTIONAL PARTS
BS3, BS8	PROGRAMMING TIME BUTTON	X18A	CONNECTOR (WIRING ADAPTOR FOR ELECTRICAL APPENDICES)
BS4, BS9	TEMPERATURE SETTING BUTTON	X23A	CONNECTOR (WIRELESS REMOTE CONTROLLER)
BS5	ADJUSTEMENT OF AIR FLOW DIRECTION		
BS6	OPERATION MODE SELECTOR BUTTON		
BS7	TIMER ON/OFF BUTTON		
BS11	FAN SPEED CONTROL BUTTON		
BS12	INSPECTION/TEST OPERATION BUTTON		
BS14	FILTER SIGN RESET BUTTON		
H1P	LIGHT EMITTING DIODE (ON-RED)		
LCD	LIQUID CRYSTAL DISPLAY		
R1T	THERMISTOR (AIR)		

FIELD WIRING

L : LIVE
N : NEUTRAL
CONNECTOR
WIRE CLAMP
PROTECTIVE EARTH (SCREW)

COLORS :
BLK : BLACK PNK : PINK
BLU : BLUE RED : RED
BRN : BROWN WHT : WHITE
ORG : ORANGE YLW : YELLOW

NOTES :
1. WHEN USING A CENTRAL REMOTE CONTROLLER, SEE MANUAL FOR CONNECTION TO THE UNIT.
2. X23A IS CONNECTED WHEN THE WIRELESS REMOTE CONTROLLER KIT IS USED.
3. WHEN CONNECTING THE INPUT WIRES FROM THE OUTDOOR UNIT, "FORCED OFF" OR "ON/OFF" OPERATION CAN BE SELECTED BY THE REMOTE CONTROLLER. FOR MORE DETAILS SEE INSTALLATION MANUAL.
4. USE COPPER CONDUCTORS ONLY.

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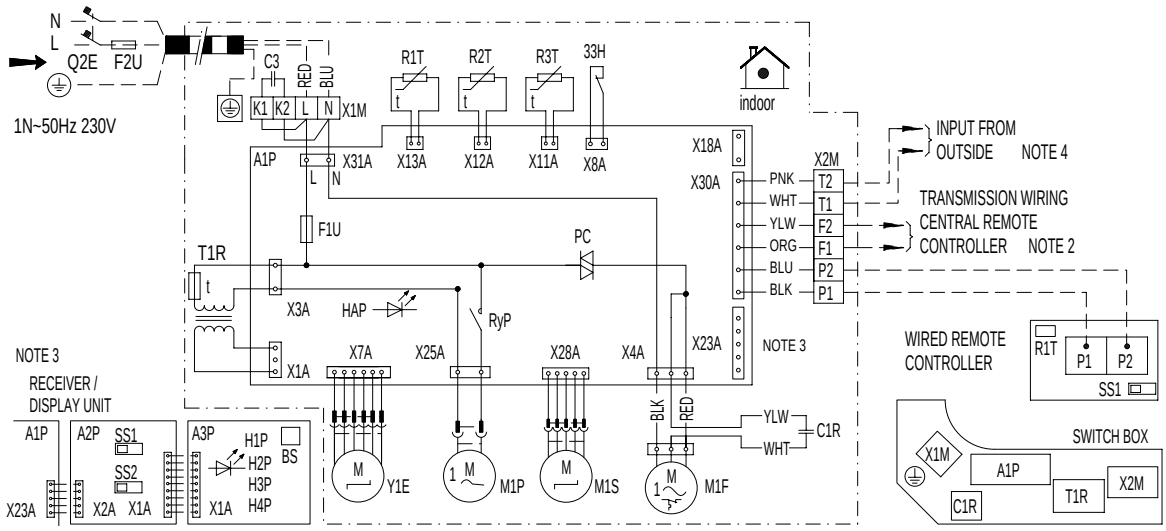
2.2 4-Way Cassette Type

CS-20·25·32·40·50·63·80·100·125UMHPP



33H	FLOAT SWITCH	X2M	TERMINAL STRIP (CONTROL)	H4P	LIGHT EMITTING DIODE (DEFROST-ORANGE)
A1P	PRINTED CIRCUIT BOARD	PC	PHASE CONTROL CIRCUIT	SS1	SELECTOR SWITCH (MAIN/SUB)
C1R	CAPACITIOR (M1F)	Y1E	ELECTRONIC EXPANSION VALVE	SS2	SELECTOR SWITCH (WIRELESS ADDRESS SET)
C3	CAPACITIOR	WIRED REMOTE CONTROLLER		CONNECTOR FOR OPTIONAL PARTS	
F1U	FUSE (250V, 5A)	R1T	THERMISTOR (AIR)	X18A	CONNECTOR (WIRING ADAPTOR FOR ELECTRICAL APPENDICES)
F2U	FIELD FUSE	SS1	SELECTOR SWITCH (MAIN/SUB)	X23A	CONNECTOR (WIRELESS REMOTE CONTROLLER)
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN)	RECEIVER/DISPLAY UNIT (ATTACHED TO WIRELESS REMOTE CONTROLLER)			
M1F	MOTOR (INDOOR FAN)	A2P,A3P	PRINTED CIRCUIT BOARD		
M1P	MOTOR (DRAIN PUMP)	BS	ON/OFF BUTTON		
M1S	MOTOR (SWING FLAP)	H1P	LIGHT EMITTING DIODE (ON-RED)		
Q1E	EARTH LEAK DETECTOR				
R1T	THERMISTOR (AIR)	H2P	LIGHT EMITTING DIODE (TIMER-GREEN)		
R2T, R3T	THERMISTOR (COIL)				
RyP	MAGNETIC RELAY (M1P)	H3P	LIGHT EMITTING DIODE (FILTER SIGN-RED)		
T1R	TRANSFORMER (220~240V/22V)				
X1M	TERMINAL STRIP (POWER)				

: FIELD WIRING
: CONNECTOR
: WIRE CLAMP
: PROTECTIVE EARTH (SCREW)
: TERMINAL

COLORS:

BLU : BLUE	PNK : PINK
BLK : BLACK	RED : RED
GRN : GREEN	WHT : WHITE
ORG : ORANGE	YLW : YELLOW

NOTES:

1. USE COPPER CONDUCTORS ONLY.
2. WHEN USING THE CENTRAL REMOTE CONTROLLER, SEE MANUAL FOR CONNECTION TO THE UNIT.
3. X23A IS CONNECTED WHEN THE WIRELESS REMOTE CONTROLLER KIT IS USED.
4. WHEN CONNECTING THE INPUT WIRES FROM OUTSIDE, FORCED OFF OR ON/OFF CONTROL OPERATION CAN BE SELECTED BY THE REMOTE CONTROLLER MANUAL. SEE INSTALLATION MANUAL FOR MORE DETAILS.

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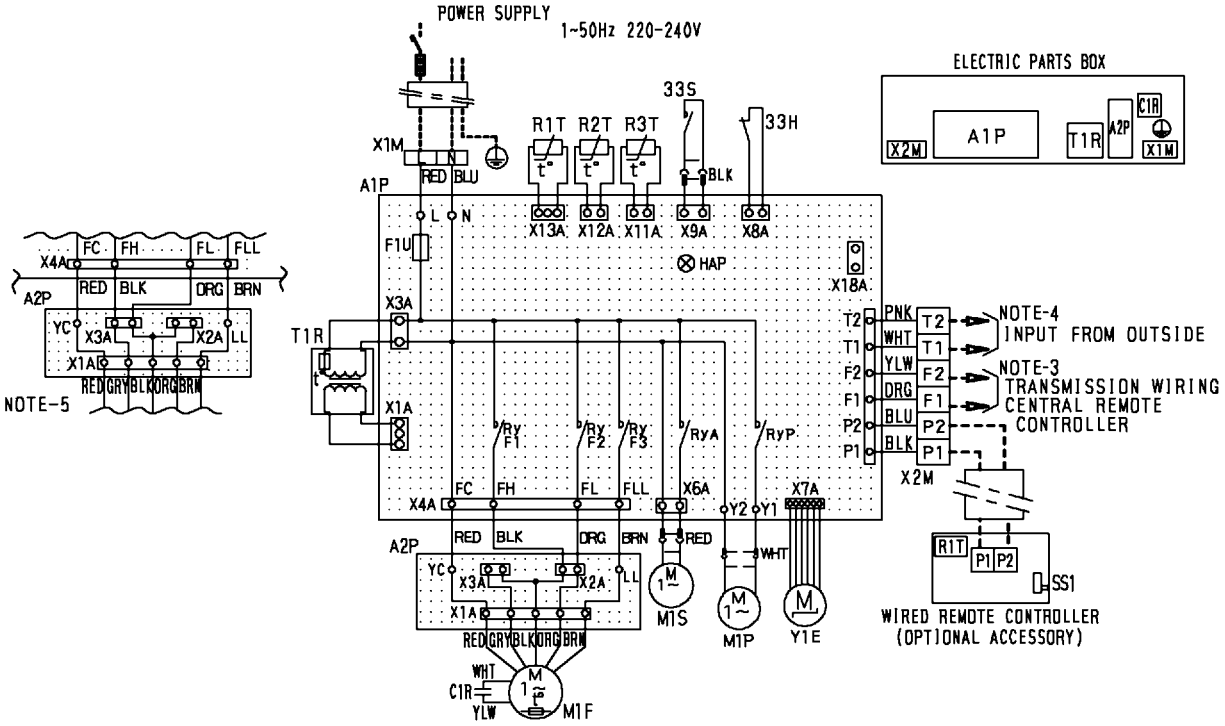
2.3 Corner Type

CS-25·32·40·63DM1HPK



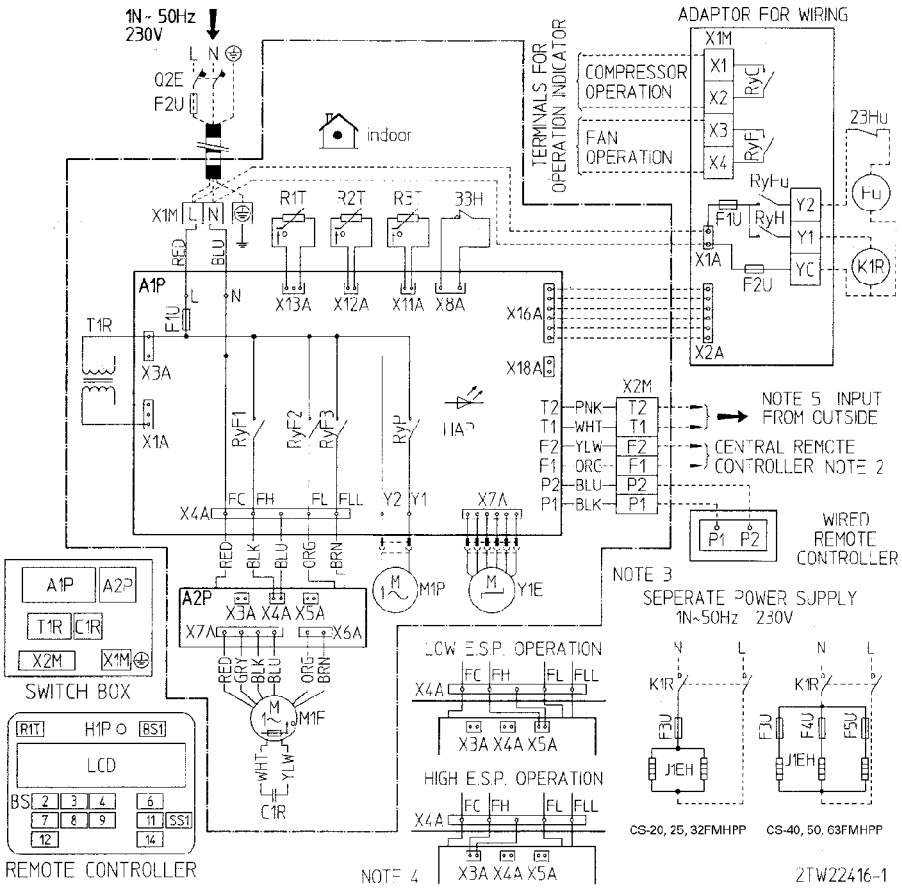
NOTES) 1. □□□: TERMINAL, ⊡⊡, ⊐I⊏ :CONNECTOR, —○— : WIRE CLAMP
2. ---- :FIELD WIRING
3. IN CASE USING CENTRAL REMOTE CONTROLLER, CONNECT IT TO THE UNIT IN ACCORDANCE WITH THE ATTACHED INSTRUCTION MANUAL.
4. WHEN CONNECTING THE INPUT WIRES FROM OUTSIDE, FORCED OFF OR ON/OFF CONTROL OPERATION CAN BE SELECTED BY REMOTE CONTROLLER. IN DETAILS, REFER TO THE INSTALLATION MANUAL ATTACHED THE UNIT.
5. IN CASE HIGH E.S.P. OPERATION, CHANGE OVER THE WIRING CONNECTION FROM X2A TO X3A.
6. SYMBOLS SHOW AS FOLLOWS, (PNK:PINK WHT:WHITE YLW:YELLOW ORG:ORANGE BLU:BLUE BLK:BLACK RED:RED BRN:BROWN GRY:GRAY)
7. USE COPPER CONDUCTORS ONLY.

33H	FLOAT SWITCH	RyA	MAGNETIC RELAY(M1S)
33S	LIMIT SWITCH(SWING FLAP)	RyF1-3	MAGNETIC RELAY(M1F)
A1P	PRINTED CIRCUIT BOARD	RyP	MAGNETIC RELAY(M1P)
A2P	TERMINAL BOARD	T1R	TRANSFOMER(220-240V/22V)
C1R	CAPACITOR (M1F)	X1M	TERMINAL STRIP(POWER)
F1T	THERMAL FUSE(105℃) (M1F EMBEDDED)	X2M	TERMINAL STRIP(CONTROL)
		Y1E	ELECTRONIC EXPANSION VALVE
F1U	FUSE (250V,5A)		
HAP	LIGHT EMISSION DIODE (SERVICE MONITOR-GREEN)	WIRED REMOTE CONTROLLER	
		R1T	THERMISTOR(AIR)
M1F	MOTOR (INDOOR FAN)	SS1	SELECTOR SWITCH (MAIN/SUB)
M1P	MOTOR (DRAIN PUMP)	CONNECTOR FOR OPTIONAL PARTS	
M1S	MOTOR (SWING FLAP)	X18A	CONNECTOR(WIRING ADAPTOR FOR ELECTORICAL APPENDICES)
R1T	THERMISTOR(AIR)		
R2T·3T	THERMISTOR(COIL)		
L-RED	N-BLU		

DU227-544C

2.4 Built-In Type

CS-20·25·32·40·50·63FMHPP



33H	FLOAT SWITCH	ADAPTOR FOR WIRING	
A1P	PRINTED CIRCUIT BOARD	RyC, RyF	MAGNETIC RELAY
A2P	TERMINAL BOARD	RyH, RyHu	MAGNETIC RELAY (J1EH, Hu)
C1R	CAPACITOR (FAN)	F1U, F2U	FUSE (250V, 5A)
F1U	FUSE (250V, 10A)	X1A, X2A	CONNECTOR (WIRING ADAPTOR)
F2U	FIELD FUSE	X1M	TERMINAL STRIP
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN)	CONNECTOR FOR OPTIONAL PARTS	
		X16A	CONNECTOR (WIRING ADAPTOR)
M1F	MOTOR (FAN)	X18A	CONNECTOR (WIRING ADAPTOR FOR ELECTRONICAL APPENDICES)
M1P	MOTOR (DRAIN PUMP)		
Q2E	EARTH LEAK DETECTOR	WIRED REMOTE CONTROLLER	
R1T	THERMISTOR (AIR)	BS1	ON/OFF BUTTON
R2T, R3T	THERMISTOR (REFRIGERANT)	BS2	TIMER MODE START/STOP BUTTON
RyF1-3	MAGNETIC RELAY (FAN)	BS3, BS8	PROGRAMMING TIME BUTTON
RyP	MAGNETIC RELAY (DRAIN PUMP)	BS4, BS9	TEMPERATURE SETTING BUTTON
T1R	TRANSFORMER (220-240V/22V)	BS6	OPERATION MODE SELECTOR BUTTON
X1M	TERMINAL STRIP (POWER)	BS7	TIMER ON/OFF BUTTON
X2M	TERMINAL STRIP (CONTROL)	BS11	FAN SPEED CONTROL BUTTON
Y1E	ELECTRONIC EXPANSION VALVE	BS12	INSPECTION/TEST OPERATION BUTTON
OPTIONAL PARTS		BS14	FILTER SIGN RESET BUTTON
23Hu	HUMIDISTAT	LCD	LIQUID CRISTAL DISPLAY
F3-5U	FUSE (250V, 16A)	H1P	LIGHT EMITTING DIODE (ON-RED)
Hu	HUMIDIFIER	R1T	THERMISTOR (AIR)
J1EH	ELECTRIC HEATER	SS1	SELECTOR SWITCH (MAIN/SUB)
K1R	MAGNETIC RELAY (J1EH)		

FIELD WIRING

L : LIVE
N : NEUTRAL
CONNECTOR
WIRE CLAMP
PROTECTIVE EARTH (SCREW)

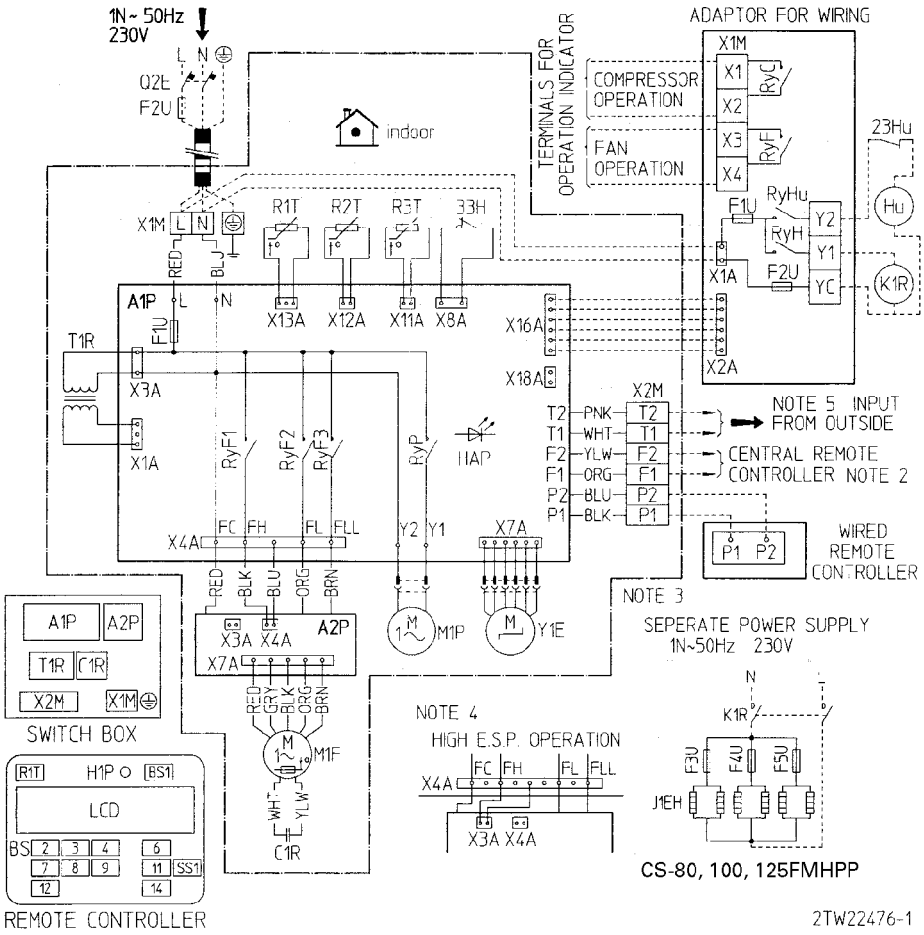
COLORS : BLK : BLACK, BLU : BLUE, BRN : BROWN, GRY : GREY, ORG : ORANGE, PNK : PINK, RED : RED, WHT : WHITE, YLW : YELLOW

NOTES :

1. USE COPPER CONDUCTORS ONLY.
2. WHEN USING THE CENTRAL REMOTE CONTROLLER, SEE MANUAL FOR CONNECTION TO THE UNIT.
3. WHEN INSTALLING THE ELECTRIC HEATER, CHANGE THE WIRING FOR THE HEATER CIRCUIT. THE MAIN POWER SUPPLY HAS TO BE SUPPLIED INDEPENDENTLY.
4. FOR HIGH OR LOW E.S.P. OPERATION, CHANGE THE WIRING CONNECTION OF X4A AS SHOWN ON THE WIRING DIAGRAM.
5. WHEN CONNECTING THE INPUT WIRES FROM OUTSIDE, "FORCED OFF" OR "ON/OFF" OPERATION CAN BE SELECTED BY THE REMOTE CONTROLLER. SEE INSTALLATION MANUAL FOR MORE DETAILS.

2TW22416-1

CS-80·100·125FMHPP



33H	FLOAT SWITCH	ADAPTOR FOR WIRING	
A1P	PRINTED CIRCUIT BOARD	RyC, RyF	MAGNETIC RELAY
A2P	TERMINAL BOARD	RyH, RyHu	MAGNETIC RELAY
C1R	CAPACITOR (FAN)	F1U, F2U	FUSE (250V, 5A)
F1U	FUSE (250V, 10A)	X1A, X2A	CONNECTOR (WIRING ADAPTOR)
F2U	FIELD FUSE	X1M	TERMINAL STRIP
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN)	CONNECTOR FOR OPTIONAL PARTS	
		X16A	CONNECTOR (WIRING ADAPTOR)
M1F	MOTOR (FAN)	X18A	CONNECTOR (WIRING ADAPTOR FOR ELECTRONICAL APPENDICES)
M1P	MOTOR (DRAIN PUMP)		
Q2E	EARTH LEAK DETECTOR	WIRED REMOTE CONTROLLER	
R1T	THERMISTOR (AIR)	BS1	ON/OFF BUTTON
R2T, R3T	THERMISTOR (REFRIGERANT)	BS2	TIMER MODE START/STOP BUTTON
RyF1-3	MAGNETIC RELAY (FAN)	BS3, BS8	PROGRAMMING TIME BUTTON
RyP	MAGNETIC RELAY (DRAIN PUMP)	BS4, BS9	TEMPERATURE SETTING BUTTON
T1R	TRANSFORMER (220-240V/22V)	BS6	OPERATION MODE SELECTOR BUTTON
X1M	TERMINAL STRIP (POWER)	BS7	TIMER ON/OFF BUTTON
X2M	TERMINAL STRIP (CONTROL)	BS11	FAN SPEED CONTROL BUTTON
Y1E	ELECTRONIC EXPANSION VALVE	BS12	INSPECTION/TEST OPERATION BUTTON
OPTIONAL PARTS		BS14	FILTER SIGN RESET BUTTON
23Hu	HUMIDISTAT	LCD	LIQUID CRISTAL DISPLAY
F3-5U	FUSE (250V, 16A)	H1P	LIGHT EMITTING DIODE (ON-RED)
Hu	HUMIDIFIER	R1T	THERMISTOR (AIR)
J1EH	ELECTRIC HEATER	SS1	SELECTOR SWITCH (MAIN/SUB)
K1R	MAGNETIC RELAY (J1EH)		

FIELD WIRING

L : LIVE
N : NEUTRAL
CONNECTOR
WIRE CLAMP
PROTECTIVE EARTH (SCREW)

COLORS : BLK : BLACK, BLU : BLUE, BRN : BROWN, GRY : GREY, ORG : ORANGE, PNK : PINK, RED : RED, WHT : WHITE, YLW : YELLOW

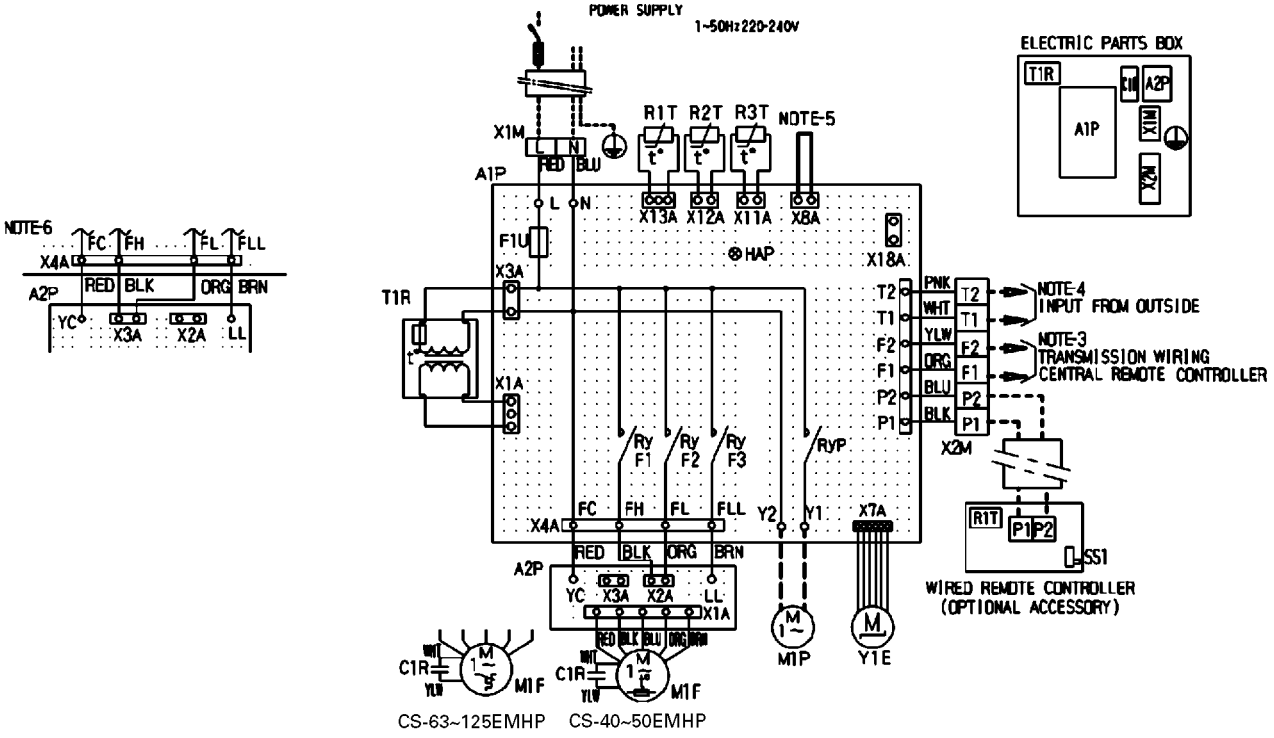
NOTES :

1. USE COPPER CONDUCTORS ONLY.
2. WHEN USING THE CENTRAL REMOTE CONTROLLER, SEE MANUAL FOR CONNECTION TO THE UNIT.
3. WHEN INSTALLING THE ELECTRIC HEATER, CHANGE THE WIRING FOR THE HEATER CIRCUIT. THE MAIN POWER SUPPLY HAS TO BE SUPPLIED INDEPENDENTLY.
4. FOR HIGH E.S.P. OPERATION, CHANGE THE WIRING CONNECTION OF X4A AS SHOWN ON THE WIRING DIAGRAM.
5. WHEN CONNECTING THE INPUT WIRES FROM OUTSIDE, FORCED "OFF" OR "ON/OFF" OPERATION CAN BE SELECTED BY THE REMOTE CONTROLLER. SEE INSTALLATION MANUAL FOR MORE DETAILS.

2TW22476-1

2.5 Ducted Type

CS-40·50·63·80·100·125EMHPK

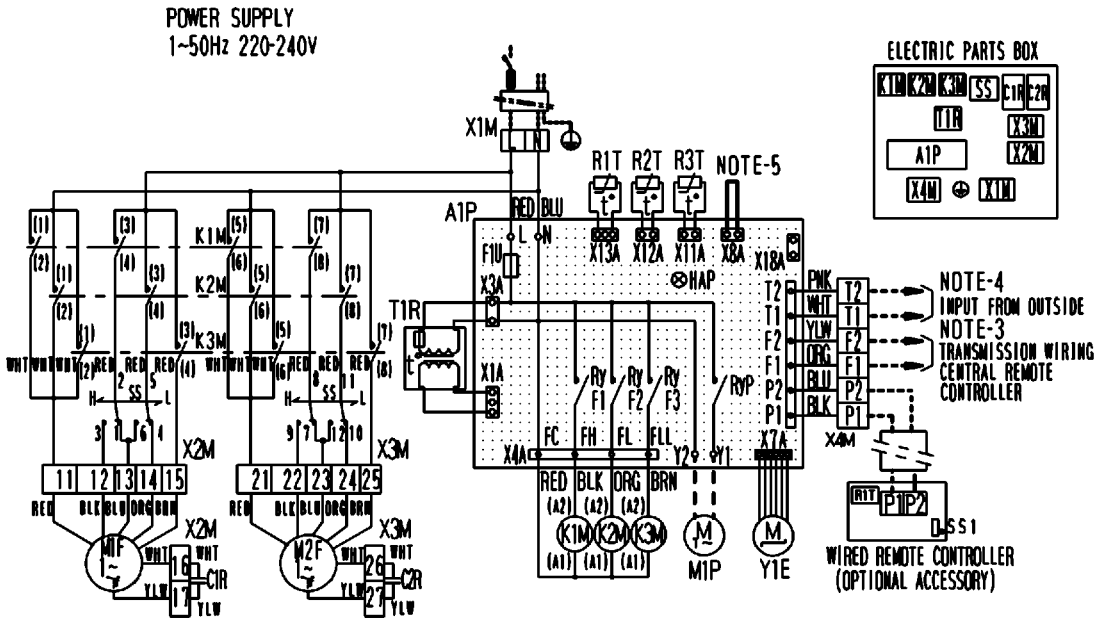


A1P	PRINTED CIRCUIT BOARD	X2M	TERMINAL STRIP(CONTROL)
A2P	TERMINAL BOARD	Y1E	ELECTRONIC EXPANSION VALVE
C1R	CAPACITOR (M1F)		
F1T	THERMAL FUSE(153℃) (M1F EMBEDDED ONLY 40-50 TYPE)	OPTIONAL PARTS	
F1U	FUSE (250V,10A)	M1P	MOTOR (DRAIN PUMP)
HAP	LIGHT EMISSION DIODE (SERVICE MONITOR-GREEN)	WIRED REMOTE CONTROLLER	
M1F	MOTOR (INDOOR FAN)	SS1	SELECTOR SWITCH (MAIN/SUB)
Q1F	THERMO SWITCH(M1F EMBEDDED ONLY 63-125 TYPE)	R1T	THERMISTOR(AIR)
R1T	THERMISTOR(AIR)	CONNECTOR FOR OPTIONAL PARTS	
R2T·3T	THERMISTOR(COIL)	X8A	CONNECTOR(FLOAT SWITCH)
RyF1-3	MAGNETIC RELAY(M1F)	X18A	CONNECTOR(WIRING ADAPTOR FOR ELECTRICAL APPENDICES)
RyP	MAGNETIC RELAY(M1P)		
T1R	TRANSFORMER(220-240V/22V)		
X1M	TERMINAL STRIP(POWER)		
L-RED	N-BLUE		

NOTES)
1. ▭ :TERMINAL, ⊙⊙, ⊙ :CONNECTOR, —○— : WIRE CLAMP, ▭ : CONNECTOR
2. ---- :FIELD WIRING
3. IN CASE USING CENTRAL REMOTE CONTROLLER, CONNECT IT TO THE UNIT IN ACCORDANCE WITH THE ATTACHED INSTRUCTION MANUAL.
4. WHEN CONNECTING THE INPUT WIRES FROM OUTSIDE, FORCED OFF OR ON/OFF CONTROL OPERATION CAN BE SELECTED BY REMOTE CONTROLLER. IN DETAILS, REFER TO THE INSTALLATION MANUAL ATTACHED THE UNIT.
5. IN CASE INSTALLING THE DRAIN PUMP, REMOVE THE JUMPER AND EXECUTE THE ADDITIONAL WIRING FOR FLOAT SWITCH(33H). X8A 33H
6. IN CASE HIGH E.S.P. OPERATION, CHANGE THE WIRING CONNECTION OF X2A AS SHOWN UPPER FIGURE.
7. SYMBOLS SHOW AS FOLLOWS. (PNK:PINK WHT:WHITE YLW:YELLOW ORG:ORANGE BLU:BLUE BLK:BLACK RED:RED BRN:BROWN)
8. USE COPPER CONDUCTORS ONLY.

DU229-5140C

CS-200·250EMHPK



A1P	PRINTED CIRCUIT BOARD	SS	SELECTOR SWITCH (STATIC PRESSURE)
C1R·2R	CAPACITOR (M1F·2F)		
F1U	FUSE (250V,10A)	T1R	TRANSFOMER(220-240V/22V)
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN)	X1M	TERMINAL STRIP(POWER)
		X2M-4M	TERMINAL STRIP(CONTROL)
K1M	MAGNETIC CONTACTOR(M1F·2F)	Y1E	ELECTRONIC EXPANSION VALVE
K2M	MAGNETIC CONTACTOR(M1F·2F)	OPTIONAL PARTS	
K3M	MAGNETIC CONTACTOR(M1F·2F)	M1P	MOTOR (DRAIN PUMP)
M1F·2F	MOTOR (INDOOR FAN)	WIRED REMOTE CONTROLLER	
Q1F	THERMO SWITCH (M1F·2F EMBEDDED)	R1T	THERMISTOR(AIR)
		SS1	SELECTOR SWITCH (MAIN/SUB)
R1T	THERMISTOR(AIR)	CONNECTOR FOR OPTIONAL PARTS	
R2T·3T	THERMISTOR(COIL)	X8A	CONNECTOR(FLOAT SWITCH)
RyF1-F3	MAGNETIC RELAY(M1F·2F)	X18A	CONNECTOR(WIRING ADAPTOR FOR ELECTORICAL APPENDICES)
RyP	MAGNETIC RELAY(M1P)		
L-RED	N-BLUE		

NOTES)

1. ▭,-●-: TERMINAL ⊡,⊏: CONNECTOR -○-: WIRE CLAMP ⊏□: JUMPER CONNECTOR
2. ---- :FIELD WIRING
3. IN CASE USING CENTRAL REMOTE CONTROLLER, CONNECT IT TO THE THE UNIT IN ACCORDANCE WITH THE ATTACHED INSTRUCTION MANUAL.
4. WHEN CONNECTING THE INPUT WIRES FROM OUTSIDE, FORCED OFF OR ON/OFF CONTROL OPERATION CAN BE SELECTED BY REMOTE CONTROLLER. IN DETAILS, REFER TO THE INSTALLATION MANUAL ATTACHED THE UNIT.
5. IN CASE INSTALLING THE DRAIN PUMP, REMOVE THE JUMPER AND EXECUTE THE ADDITIONAL WIRING FOR FLOAT SWITCH(33H).
6. SYMBOLS SHOW AS FOLLOWS, (PNK:PINK WHT:WHITE YLW:YELLOW ORG:ORANGE BLU:BLUE BLK:BLACK RED:RED BRN:BROWN)
7. USE COPPER CONDUCTORS ONLY.
8. IN CASE HIGH E.S.P. OPERATION, CHANGE THE SWITCH(SS) FOR "H".

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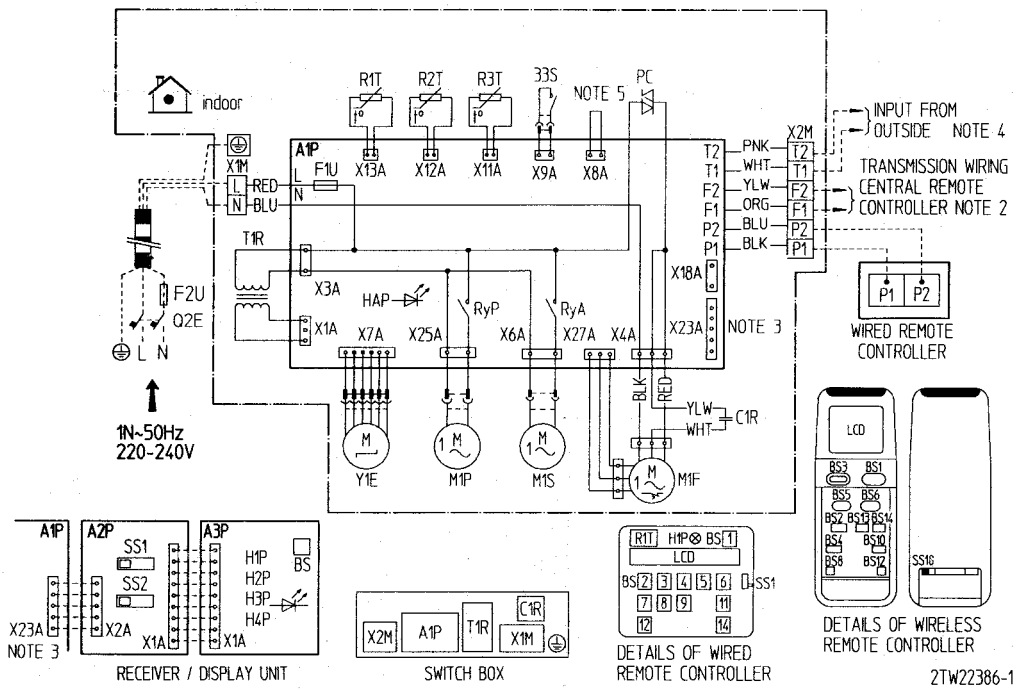
2.6 Ceiling Type

CS-32·63·100TMJPL



: FIELD WIRING
: CONNECTOR
: WIRE CLAMP
: TERMINAL
: PROTECTIVE EARTH (SCREW)

COLORS : BLU : BLUE PNK : PINK
BLK : BLACK RED : RED
GRN : GREEN WHT : WHITE
ORG : ORANGE YLW : YELLOW

NOTES

1. USE COPPER CONDUCTORS ONLY.
2. WHEN USING THE CENTRAL REMOTE CONTROLLER, SEE MANUAL FOR CONNECTION TO THE UNIT.
3. X23A IS CONNECTED WHEN THE WIRELESS REMOTE CONTROLLER KIT IS USED.
4. WHEN CONNECTING THE INPUT WIRES FROM OUTSIDE, "FORCED OFF" OR "ON/OFF" CONTROL OPERATION CAN BE SELECTED BY THE REMOTE CONTROLLER MANUAL. SEE INSTALLATION MANUAL FOR MORE DETAILS.
5. WHEN INSTALLING THE DRAIN PUMP, REMOVE THE JUMPER OF CONNECTOR X8A AND EXECUTE THE ADDITIONAL WIRING FOR THE FLOAT SWITCH AND DRAIN PUMP.

33S	LIMIT SWITCH (SWING FLAP)	BS2	TIMER MODE START/STOP BUTTON	LCD	LIQUID CRYSTAL DISPLAY
A1P	PRINTED CIRCUIT BOARD	BS3, BS8	PROGRAMMING TIME BUTTON	SS18	SELECTOR SWITCH (WIRELESS ADDRESS SET)
C1R	CAPACITIOR (M1F)	BS4, BS9	TEMPERATURE SETTING BUTTON		
F1U	FUSE (250V, 5A)	BS5	AIR FLOW DIRECTION ADJUST BUTTON	RECEIVER/DISPLAY UNIT (ATTACHED TO WIRELESS REMOTE CONTROLLER)	
F2U	FIELD FUSE	BS6	OPERATION MODE SELECTOR BUTTON		
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN)	BS7	TIMER ON/OFF BUTTON	A2P, A3P	PRINTED CIRCUIT BOARD
		BS11	FAN SPEED BUTTON	BS	ON/OFF BUTTON
M1F	MOTOR (INDOOR FAN)	BS12	INSPECTION/TEST BUTTON	H1P	LIGHT EMITTING DIODE (ON-RED)
M1S	MOTOR (SWING FLAP)	BS14	FILTER SIGN RESET BUTTON		
PC	PHASE CONTROL CIRCUIT	H1P	LIGHT EMITTING DIODE (SERVICE MONITOR-RED)	H2P	LIGHT EMITTING DIODE (TIMER-GREEN)
Q1F	THERMOSWITCH (M1F EMBEDDED)				
Q2E	EARTH LEAK DETECTOR	LCD	LIQUID CRYSTAL DISPLAY	H3P	LIGHT EMITTING DIODE (FILTER SIGN-RED)
R1T	THERMISTOR (AIR)	SS1	SELECTOR SWITCH (MAIN/SUB)		
R2T, R3T	THERMISTOR (COIL)	WIRELESS REMOTE CONTROLLER		H4P	LIGHT EMITTING DIODE (DEFROST-ORANGE)
RyA	MAGNETIC RELAY (M1S)	BS1	ON/OFF BUTTON	SS1	SELECTOR SWITCH (MAIN/SUB)
RyP	MAGNETIC RELAY (M1P)	BS2	TIMER MODE START/STOP BUTTON	SS2	SELECTOR SWITCH (WIRELESS ADDRESS SET)
T1R	TRANSFORMER (220V-240V/27V)	BS3	PUSH BUTTON (FAN SPEED)		
X1M	TERMINAL STRIP (POWER)	BS4	AIR FLOW DIRECTION ADJUST BUTTON	CONNECTOR FOR OPTIONAL PARTS	
X2M	TERMINAL STRIP (CONTROL)	BS5, BS6	TIME/TEMPERATURE SET BUTTON	X8A	CONNECTOR (FLOAT SWITCH)
Y1E	ELECTRONIC EXPANSION VALVE	BS8	INSPECTION/TEST BUTTON	X18A	CONNECTOR (WIRING ADAPTOR FOR ELECTORICAL APPENDICES)
OPTIONAL PARTS		BS10	OPERATION MODE SELECTOR BUTTON		
M1P	MOTOR (DRAIN PUMP)	BS12	FILTER SIGN RESET BUTTON		
WIRED REMOTE CONTROLLER		BS13	TIMER ON BUTTON	X23A	CONNECTOR (WIRELESS REMOTE CONTROLLER)
BS1	ON/OFF BUTTON	BS14	TIMER OFF BUTTON		

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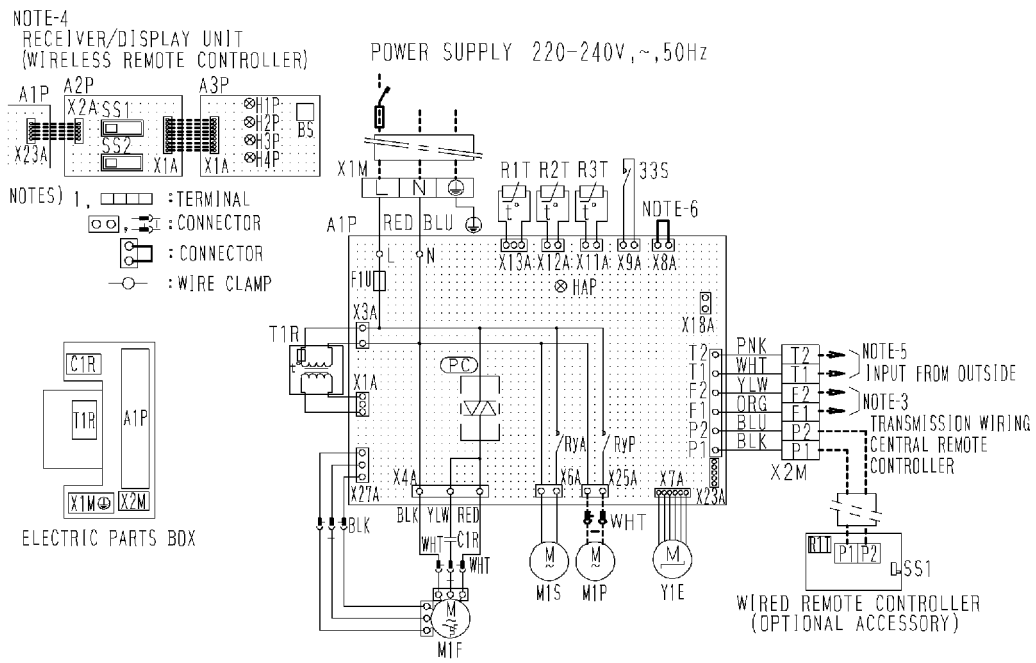
2.7 Wall Type

CS-20·25·32·40·50·63KM1HPK



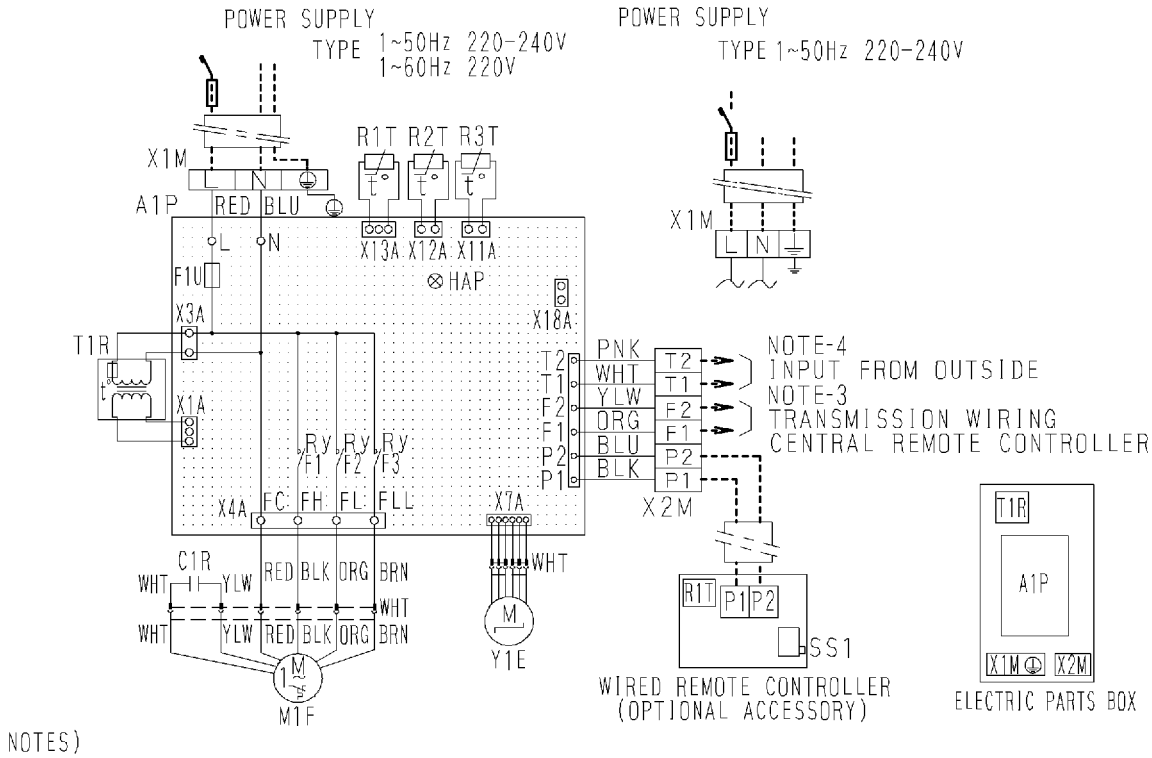
33S	LIMIT SWITCH(SWING FLAP)	H3P	LIGHT EMITTING DIODE (FILTER SIGN-RED)
A1P	PRINTED CIRCUIT BOARD	H4P	LIGHT EMITTING DIODE (DEFROST-ORANGE)
C1R	CAPACITOR (M1F)	SS1	SELECTOR SWITCH(MAIN/SUB)
F1U	FUSE(250V,5A)	SS2	SELECTOR SWITCH (WIRELESS ADDRESS SET)
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN)	CONNECTOR FOR OPTIONAL PARTS	
M1F	MOTOR(INDOOR FAN)	X8A	CONNECTOR(FLOAT SWITCH)
Q1F	THERMO SWITCH (M1F EMBEDDED)	X18A	CONNECTOR(WIRING ADAPTOR FOR ELECTORICAL APPENDICES)
M1S	MOTOR(SWING FLAP)	X23A	CONNECTOR(WIRELESS REMOTE CONTROLLER)
R1T	THERMISTOR(AIR)	L-RED	N-BLU
R2T·3T	THERMISTOR(COIL)		
RyA	MAGNETIC RELAY(M1S)		
RyP	MAGNETIC RELAY(M1P)		
T1R	TRANSFOMER(220-240V/22V)		
X1M	TERMINAL STRIP(POWER)		
X2M	TERMINAL STRIP(CONTROL)		
Y1E	ELECTRONIC EXPANSION VALVE		
PC	PHASE CONTROL CIRCUIT		
OPTIONAL PARTS			
M1P	MOTOR (DRAIN PUMP)		
WIRED REMOTE CONTROLLER			
R1T	THERMISTOR(AIR)		
SS1	SELECTOR SWITCH(MAIN/SUB)		
RECEIVER/DISPLAY UNIT(ATTACHED TO WIRELESS REMOTE CONTROLLER)			
A2P	PRINTED CIRCUIT BOARD		
A3P	PRINTED CIRCUIT BOARD		
BS	PUSH BUTTON(ON/OFF)		
H1P	LIGHT EMITTING DIODE (ON-RED)		
H2P	LIGHT EMITTING DIODE (TIMER-GREEN)		

NOTES) 1. :TERMINAL
:CONNECTOR
:CONNECTOR
:WIRE CLAMP
2. ---- :FIELD WIRING
3. IN CASE USING CENTRAL REMOTE CONTROLLER, CONNECT IT TO THE UNIT IN ACCORDANCE WITH THE ATTACHED INSTRUCTION MANUAL.
4. X23A IS CONNECTED WHEN THE WIRELESS REMOTE CONTROLLER KIT IS BEING USED.
5. WHEN CONNECTING THE INPUT WIRES FROM OUTSIDE, FORCED OFF OR ON/OFF CONTROL OPERATION CAN BE SELECTED BY REMOTE CONTROLLER. IN DETAILS, REFER TO THE INSTALLATION MANUAL ATTACHED THE UNIT.
6. IN CASE INSTALLING THE DRAIN PUMP, REMOVE THE JUMPER CONNECTOR OF X8A AND EXECUTE THE ADDITIONAL WIRING FOR FLOAT SWITCH AND DRAIN PUMP.
7. SYMBOLS SHOW AS FOLLOWS.
(PNK:PINK WHT:WHITE YLW:YELLOW ORG:ORANGE
BLU:BLUE BLK:BLACK RED:RED)
8. USE COPPER CONDUCTORS ONLY.

DU221-561F

2.8 Floor Standing Type / Concealed Floor Standing Type

CS-20·25·32·40·50·63PM1HPK
CS-20·25·32·40·50·63RM1HPK



NOTES)

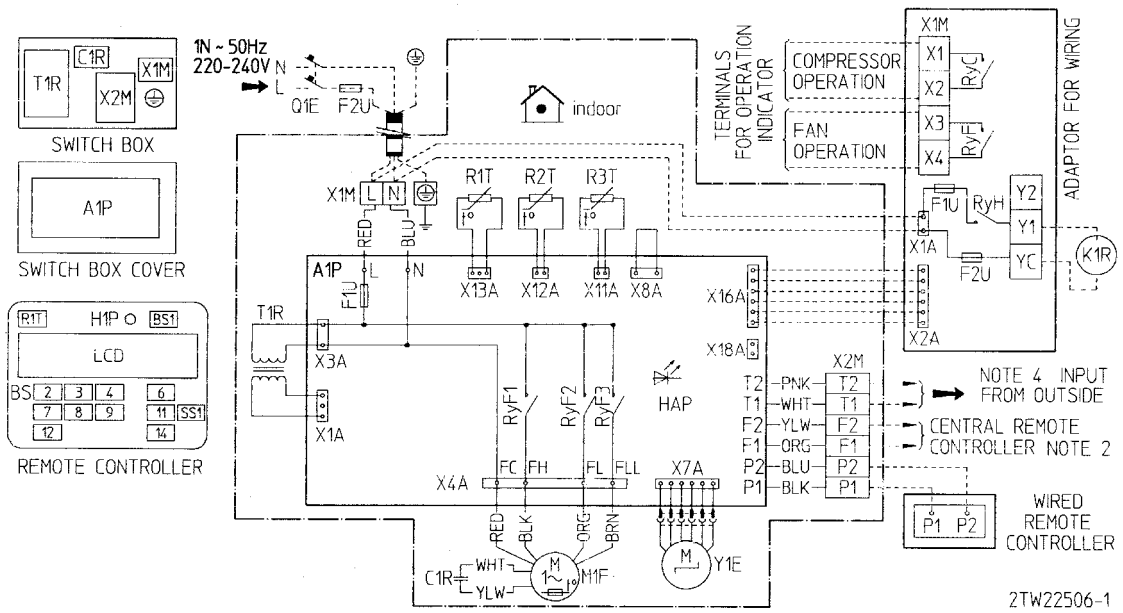
1. ▭▭:TERMINAL, ▭▭, ⊐:CONNECTOR, —○—:WIRE CLAMP
2. ----:FIELD WIRING
3. IN CASE USING CENTRAL REMOTE CONTROLLER, CONNECT IT TO THE UNIT IN ACCORDANCE WITH THE ATTACHED INSTRUCTIO MANUAL.
4. WHEN CONNECTING THE INPUT WIRES FROM OUTSIDE, FORCED OFF OR ON/OFF CONTROL OPERATION CAN BE SELECTED BY REMOTE CONTROLLER, IN DETAILS, REFER TO THE INSTALLATION MANUAL ATTACHED THE UNIT.
5. SYMBOLS SHOW AS FOLLOWS. (PNK:PINK WHT:WHITE YLW:YELLOW ORG:ORANGE BLU:BLUE BLK:BLACK RED:RED BRN:BROWN)
6. USE COPPER CONDUCTORS ONLY.

A1P	PRINTED CIRCUIT BOARD	WIRED REMOTE CONTROLLER	
C1R	CAPACITOR (M1F)	R1T	THERMISTOR(AIR)
F1U	FUSE (250V,10A)	SS1	SELECTOR SWITCH(MAIN/SUB)
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN)	CONNECTOR FOR OPTIONAL PARTS	
		X18A	CONNECTOR(WIRING ADAPTOR FOR ELECTORICAL APPENDICES)
M1F	MOTOR (INDOOR FAN)		
Q1F	THERMO SWITCH (M1F EMBEDDED)		
R1T	THERMISTOR(AIR)		
R2T·3T	THERMISTOR(COIL)		
RyF1-3	MAGNETIC RELAY(M1F)		
T1R	TRANSFOMER(220-240V/22V)		
X1M	TERMINAL STRIP(POWER)		
X2M	TERMINAL STRIP(CONTROL)		
Y1E	ELECTRONIC EXPANSION VALVE		
L-RED	N-BLUE		

3D003923E

2.9 Small Duct Type

CS-20·25NM1HPP



A1P	PRINTED CIRCUIT BOARD	F1U, F2U	FUSE (250V, 5A)
C1R	CAPACITOR (FAN)	X1A, X2A	CONNECTOR (WIRING ADAPTOR)
F1U	FUSE (250V, 10A)	X1M	TERMINAL STRIP
F2U	FIELD FUSE	CONNECTOR FOR OPTIONAL PARTS	
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN)	X16A	CONNECTOR (WIRING ADAPTOR)
		X18A	CONNECTOR (WIRING ADAPTOR FOR ELECTRONICAL APPENDICES)
M1F	MOTOR (FAN)		
Q1E	EARTH LEAK DETECTOR	WIRED REMOTE CONTROLLER	
R1T	THERMISTOR (AIR)	BS1	ON/OFF BUTTON
R2T, R3T	THERMISTOR (REFRIGERANT)	BS2	TIMER MODE START/STOP BUTTON
RyF1-3	MAGNETIC RELAY (FAN)	BS3, BS8	PROGRAMMING TIME BUTTON
T1R	TRANSFORMER (220V/27V)	BS4, BS9	TEMPERATURE SETTING BUTTON
X1M	TERMINAL STRIP (POWER)	BS6	OPERATION MODE SELECTOR BUTTON
X2M	TERMINAL STRIP (CONTROL)	BS7	TIMER ON/OFF BUTTON
Y1E	ELECTRONIC EXPANSION VALVE	BS11	FAN SPEED CONTROL BUTTON
OPTIONAL PARTS		BS12	INSPECTION/TEST OPERATION BUTTON
J1EH	ELECTRIC HEATER	BS14	FILTER SIGN RESET BUTTON
K1R	MAGNETIC RELAY (J1EH)	LCD	LIQUID CRISTAL DISPLAY
ADAPTOR FOR WIRING		H1P	LIGHT EMITTING DIODE (ON-RED)
RyC, RyF	MAGNETIC RELAY	R1T	THERMISTOR (AIR)
RyH	MAGNETIC RELAY (J1EH)	SS1	SELECTOR SWITCH (MAIN/SUB)

FIELD WIRING

L : LIVE
N : NEUTRAL

: CONNECTOR
: WIRE CLAMP
: PROTECTIVE EARTH (SCREW)

COLORS : BLK : BLACK, BLU : BLUE, BRN : BROWN, ORG : ORANGE, PNK : PINK, RED : RED, WHT : WHITE, YLW : YELLOW

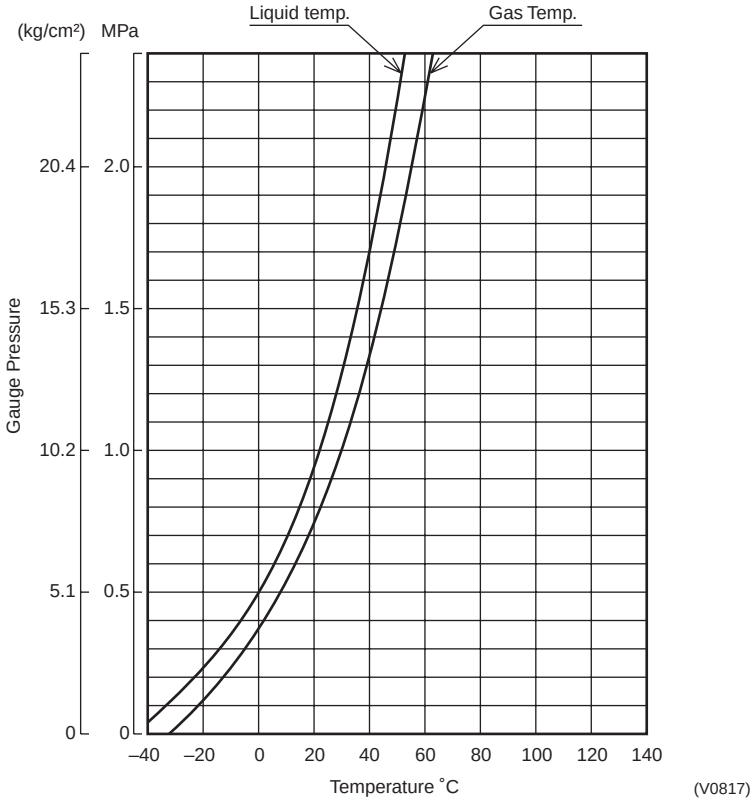
NOTES :

1. USE COPPER CONDUCTORS ONLY.
2. WHEN USING THE CENTRAL REMOTE CONTROLLER, SEE MANUAL FOR CONNECTION TO THE UNIT.
3. WHEN INSTALLING THE ELECTRIC HEATER, CHANGE THE WIRING FOR THE HEATER CIRCUIT. THE MAIN POWER SUPPLY HAS TO BE SUPPLIED INDEPENDENTLY.
4. WHEN CONNECTING THE INPUT WIRES FROM OUTSIDE, "FORCED OFF" OR "ON/OFF" OPERATION CAN BE SELECTED BY THE REMOTE CONTROLLER. SEE INSTALLATION MANUAL FOR MORE DETAILS.

2TW22506-1

3. Characteristics

3.1 R407C Characteristics



Pressure MPa	Temperature		Pressure MPa	Temperature		Pressure MPa	Temperature	
	Liquid Side °C	Gas Side °C		Liquid Side °C	Gas Side °C		Liquid Side °C	Gas Side °C
0.00	—	–37.0	1.00	21.7	27.5	2.00	46.9	51.9
0.05	—	–28.9	1.05	23.2	29.0	2.05	47.9	52.8
0.10	—	–21.4	1.10	24.7	30.5	2.10	48.9	53.7
0.15	—	–16.3	1.15	26.3	32.0	2.15	49.8	54.6
0.20	—	–11.5	1.20	27.8	33.5	2.20	50.8	55.6
0.25	—	–7.6	1.25	29.3	34.9	2.25	51.8	56.5
0.30	—	–3.7	1.30	30.9	36.4	2.30	52.7	57.4
0.35	—	–0.6	1.35	32.0	37.6	2.35	53.7	58.3
0.40	—	2.5	1.40	33.2	38.7	2.40	54.7	59.2
0.45	–1.1	5.4	1.45	34.4	39.9	2.45	55.6	60.2
0.50	1.4	7.9	1.50	35.6	41.1	2.50	56.6	61.1
0.55	3.9	10.3	1.55	36.8	42.2	2.60	58.4	62.8
0.60	6.4	12.7	1.60	38.1	43.4	2.70	60.0	64.3
0.65	8.7	14.9	1.65	39.3	44.6	2.80	61.6	65.9
0.70	10.6	16.8	1.70	40.5	45.7	2.90	63.2	67.4
0.75	12.6	18.7	1.75	41.7	46.9	3.00	64.9	68.9
0.80	14.5	20.6	1.80	42.9	48.1	3.10	66.5	70.5
0.85	16.5	22.5	1.85	44.1	49.2	3.20	68.1	72.0
0.90	18.4	24.4	1.90	45.0	50.0	3.30	69.8	73.5
0.95	20.2	26.1	1.95	46.0	50.9	3.40	71.4	75.1

3.2 Thermistor Resistance / Temperature Characteristics

Indoor unit	For air suction	R1T	
	For liquid pipe	R2T	
	For gas pipe	R3T	
Outdoor unit	For outdoor air	R1T	
	For coil	R2T	(R2-1T, R2-2T)
	For suction pipe	R4T	(R4-1T, R4-2T)
	For oil	R5T	
	For header	R6T	

(kΩ)

T°C	0.0	0.5	T°C	0.0	0.5
-20	197.81	192.08	30	16.10	15.76
-19	186.53	181.16	31	15.43	15.10
-18	175.97	170.94	32	14.79	14.48
-17	166.07	161.36	33	14.18	13.88
-16	156.80	152.38	34	13.59	13.31
-15	148.10	143.96	35	13.04	12.77
-14	139.94	136.05	36	12.51	12.25
-13	132.28	128.63	37	12.01	11.76
-12	125.09	121.66	38	11.52	11.29
-11	118.34	115.12	39	11.06	10.84
-10	111.99	108.96	40	10.63	10.41
-9	106.03	103.18	41	10.21	10.00
-8	100.41	97.73	42	9.81	9.61
-7	95.14	92.61	43	9.42	9.24
-6	90.17	87.79	44	9.06	8.88
-5	85.49	83.25	45	8.71	8.54
-4	81.08	78.97	46	8.37	8.21
-3	76.93	74.94	47	8.05	7.90
-2	73.01	71.14	48	7.75	7.60
-1	69.32	67.56	49	7.46	7.31
0	65.84	64.17	50	7.18	7.04
1	62.54	60.96	51	6.91	6.78
2	59.43	57.94	52	6.65	6.53
3	56.49	55.08	53	6.41	6.53
4	53.71	52.38	54	6.65	6.53
5	51.09	49.83	55	6.41	6.53
6	48.61	47.42	56	6.18	6.06
7	46.26	45.14	57	5.95	5.84
8	44.05	42.98	58	5.74	5.43
9	41.95	40.94	59	5.14	5.05
10	39.96	39.01	60	4.96	4.87
11	38.08	37.18	61	4.79	4.70
12	36.30	35.45	62	4.62	4.54
13	34.62	33.81	63	4.46	4.38
14	33.02	32.25	64	4.30	4.23
15	31.50	30.77	65	4.16	4.08
16	30.06	29.37	66	4.01	3.94
17	28.70	28.05	67	3.88	3.81
18	27.41	26.78	68	3.75	3.68
19	26.18	25.59	69	3.62	3.56
20	25.01	24.45	70	3.50	3.44
21	23.91	23.37	71	3.38	3.32
22	22.85	22.35	72	3.27	3.21
23	21.85	21.37	73	3.16	3.11
24	20.90	20.45	74	3.06	3.01
25	20.00	19.56	75	2.96	2.91
26	19.14	18.73	76	2.86	2.82
27	18.32	17.93	77	2.77	2.72
28	17.54	17.17	78	2.68	2.64
29	16.80	16.45	79	2.60	2.55
30	16.10	15.76	80	2.51	2.47

Outdoor Unit
Thermistors for
Discharge Pipe
(R3T, R3-1T, R3-2T)

(kΩ))

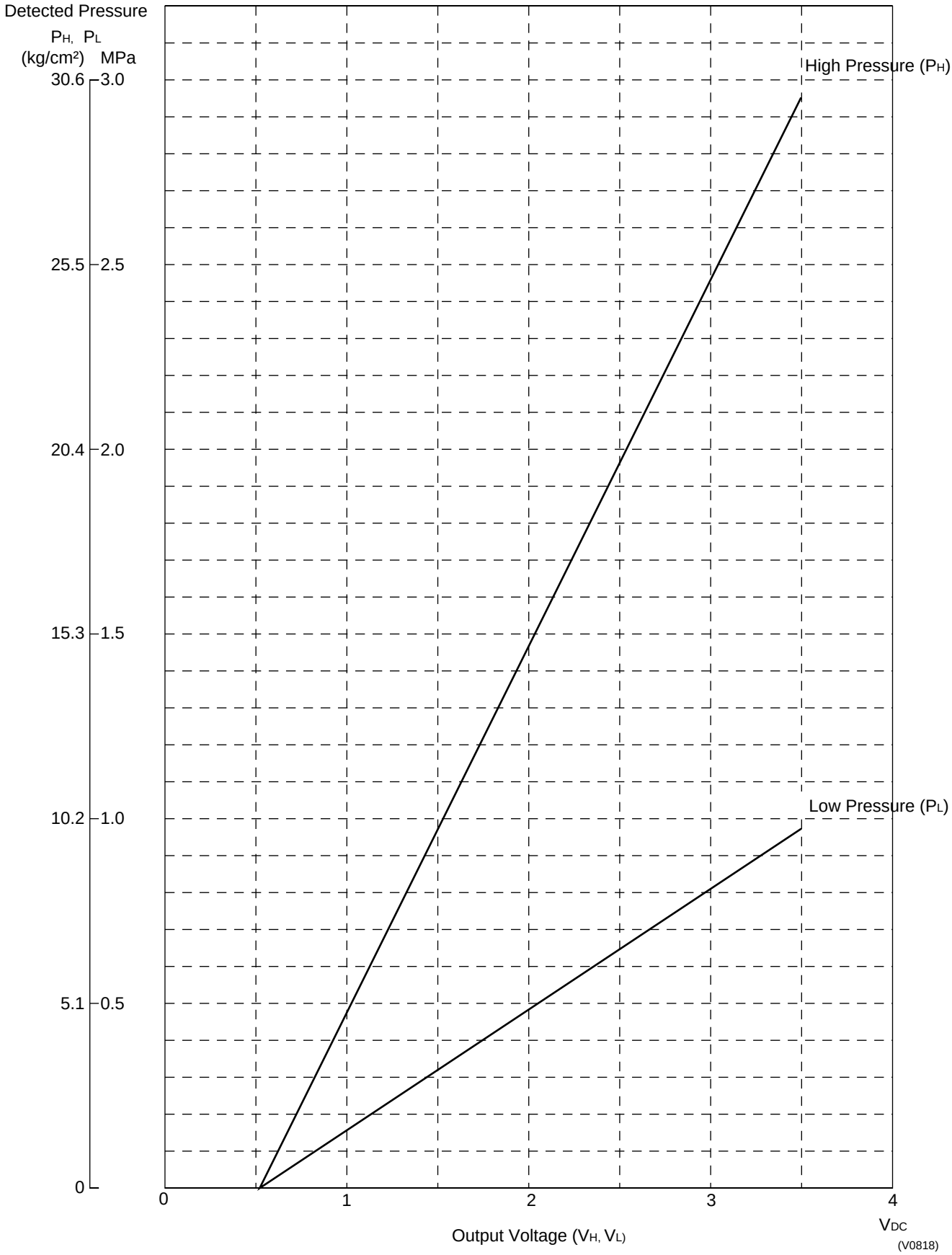
T°C	0.0	0.5	T°C	0.0	0.5	T°C	0.0	0.5
0	640.44	624.65	50	72.32	70.96	100	13.35	13.15
1	609.31	594.43	51	69.64	68.34	101	12.95	12.76
2	579.96	565.78	52	67.06	65.82	102	12.57	12.38
3	552.00	538.63	53	64.60	63.41	103	12.20	12.01
4	525.63	512.97	54	62.24	61.09	104	11.84	11.66
5	500.66	488.67	55	59.97	58.87	105	11.49	11.32
6	477.01	465.65	56	57.80	56.75	106	11.15	10.99
7	454.60	443.84	57	55.72	54.70	107	10.83	10.67
8	433.37	423.17	58	53.72	52.84	108	10.52	10.36
9	413.24	403.57	59	51.98	50.96	109	10.21	10.06
10	394.16	384.98	60	49.96	49.06	110	9.92	9.78
11	376.05	367.35	61	48.19	47.33	111	9.64	9.50
12	358.88	350.62	62	46.49	45.67	112	9.36	9.23
13	342.58	334.74	63	44.86	44.07	113	9.10	8.97
14	327.10	319.66	64	43.30	42.54	114	8.84	8.71
15	312.41	305.33	65	41.79	41.06	115	8.59	8.47
16	298.45	291.73	66	40.35	39.65	116	8.35	8.23
17	285.18	278.80	67	38.96	38.29	117	8.12	8.01
18	272.58	266.51	68	37.63	36.98	118	7.89	7.78
19	260.60	254.72	69	36.34	35.72	119	7.68	7.57
20	249.00	243.61	70	35.11	34.51	120	7.47	7.36
21	238.36	233.14	71	33.92	33.35	121	7.26	7.16
22	228.05	223.08	72	32.78	32.23	122	7.06	6.97
23	218.24	213.51	73	31.69	31.15	123	6.87	6.78
24	208.90	204.39	74	30.63	30.12	124	6.69	6.59
25	200.00	195.71	75	29.61	29.12	125	6.51	6.42
26	191.53	187.44	76	28.64	28.16	126	6.33	6.25
27	183.46	179.57	77	27.69	27.24	127	6.16	6.08
28	175.77	172.06	78	26.79	26.35	128	6.00	5.92
29	168.44	164.90	79	25.91	25.49	129	5.84	5.76
30	161.45	158.08	80	25.07	24.66	130	5.69	5.61
31	154.79	151.57	81	24.26	23.87	131	5.54	5.46
32	148.43	145.37	82	23.48	23.10	132	5.39	5.32
33	142.37	139.44	83	22.73	22.36	133	5.25	5.18
34	136.59	133.79	84	22.01	21.65	134	5.12	5.05
35	131.06	128.39	85	21.31	20.97	135	4.98	4.92
36	125.79	123.24	86	20.63	20.31	136	4.86	4.79
37	120.76	118.32	87	19.98	19.67	137	4.73	4.67
38	115.95	113.62	88	19.36	19.05	138	4.61	4.55
39	111.35	109.13	89	18.75	18.46	139	4.49	4.44
40	106.96	104.84	90	18.17	17.89	140	4.38	4.32
41	102.76	100.73	91	17.61	17.34	141	4.27	4.22
42	98.75	96.81	92	17.07	16.80	142	4.16	4.11
43	94.92	93.06	93	16.54	16.29	143	4.06	4.01
44	91.25	89.47	94	16.04	15.79	144	3.96	3.91
45	87.74	86.04	95	15.55	15.31	145	3.86	3.81
46	84.38	82.75	96	15.08	14.85	146	3.76	3.72
47	81.16	79.61	97	14.62	14.40	147	3.67	3.62
48	78.09	76.60	98	14.18	13.97	148	3.58	3.54
49	75.14	73.71	99	13.76	13.55	149	3.49	3.45
50	72.32	70.96	100	13.35	13.15	150	3.41	3.37

3.3 Pressure Sensor

High Pressure $P_H=(V_H-0.5)\times 0.98$

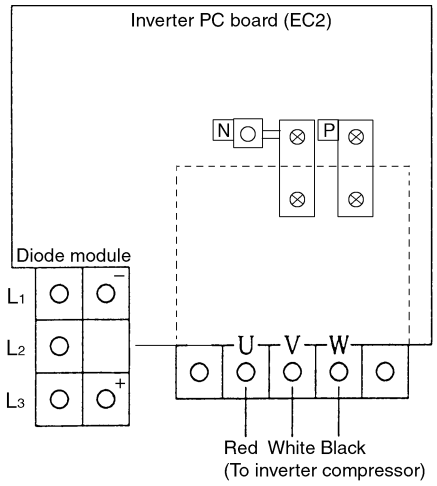
Low Pressure $P_L=(V_L-0.5)\times \frac{0.98}{3}$

P_H : Detected Pressure [High Side] MPa
P_L : Detected Pressure [Low Side] MPa
V_H : Output Voltage [High Side] V_{DC}
V_L : Output Voltage [Low Side] V_{DC}



3.4 Method of Replacing The Inverter's Power Transistors and Diode Modules

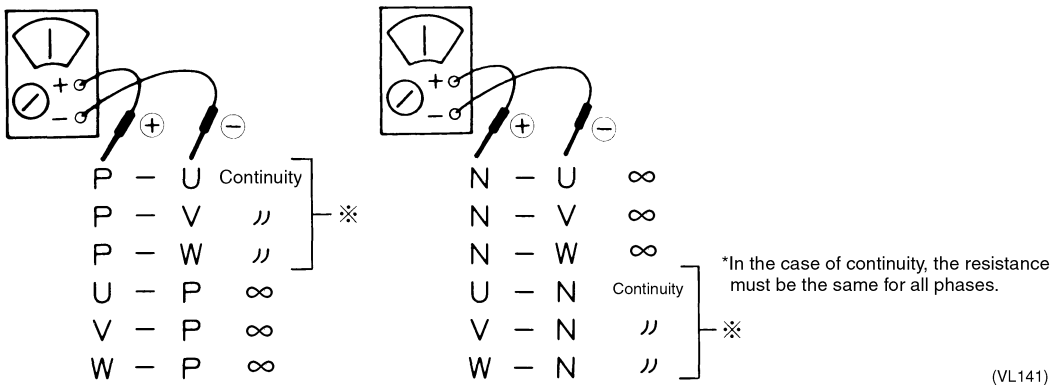
3.4.1 Method of Replacing The Inverter's Power Transistors and Diode Modules



[Decision according to continuity check by analog tester]

■ Before checking, disconnect the electric wiring connected to the power transistor and diode module.

Power Transistor (On Inverter PC Board)

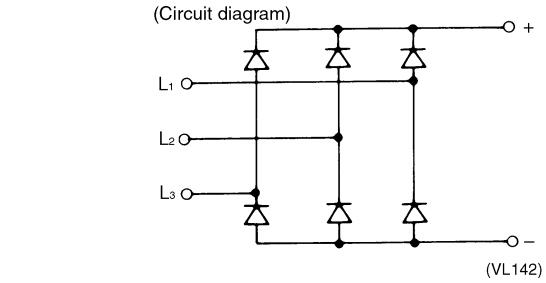

P – U Continuity
P – V 〃
P – W 〃
U – P ∞
V – P ∞
W – P ∞
※
N – U ∞
N – V ∞
N – W ∞
U – N Continuity
V – N 〃
W – N 〃
※
*In the case of continuity, the resistance must be the same for all phases.
(VL141)

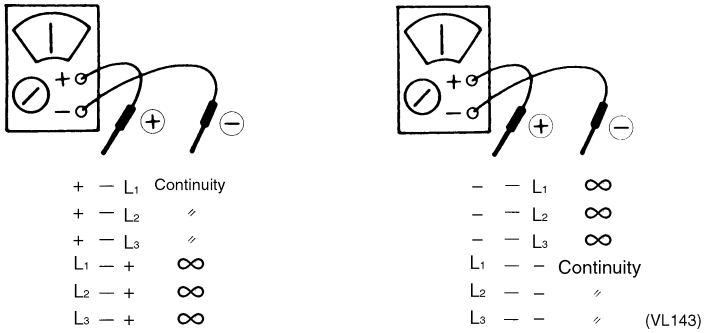
(Decision)

If other than given above, the power unit is defective and must be replaced.

Note: If using a digital tester, ∞ and continuity may be reversed.

Diode Module





(Decision)
If other than given above, the diode module is defective and must be replaced.

Note: If using a digital tester, ∞ and continuity may be reversed.

4. Precaution

4.1 PC Boards and Remote Controller's Mode No.

4.1.1 Precautions When Replacing MX1(R), ME1(R) Series PC Boards

If you replace the indoor or outside unit PC board, push and hold the RESET button on the outdoor unit PC Board for 5 seconds. In this case, the unit will not run for up to 12 minutes.

■ **Precautions when replacing indoor unit PC board**

When replacing the indoor unit PC board, the following contents are factory set.
Change the settings if necessary.

1. Field set contents (dirty filter, stop input from outside, etc.)
   ◆Change settings with the remote controller.
   ◆When using group control or setting by individual indoor units, the "indoor unit No." before and after changing the PC board may differ.
   Set after checking the indoor unit No.
2. Central address
   Change setting with the remote controller.
3. Capacity display
   A capacity setting adaptor must be installed for all models.
   ∗Fan phase control is for CS-UM, CS-TM, CS-KM only.

■ **Precautions when replacing outdoor unit PC board**

When replacing the outdoor unit PC board, set the following settings again.

1. Field set contents (setting mode 1)
   Set cool/heat selection, low noise and sequential start again.
2. Setting mode 2
   Change the TC setting, TE setting and defrost setting as required.

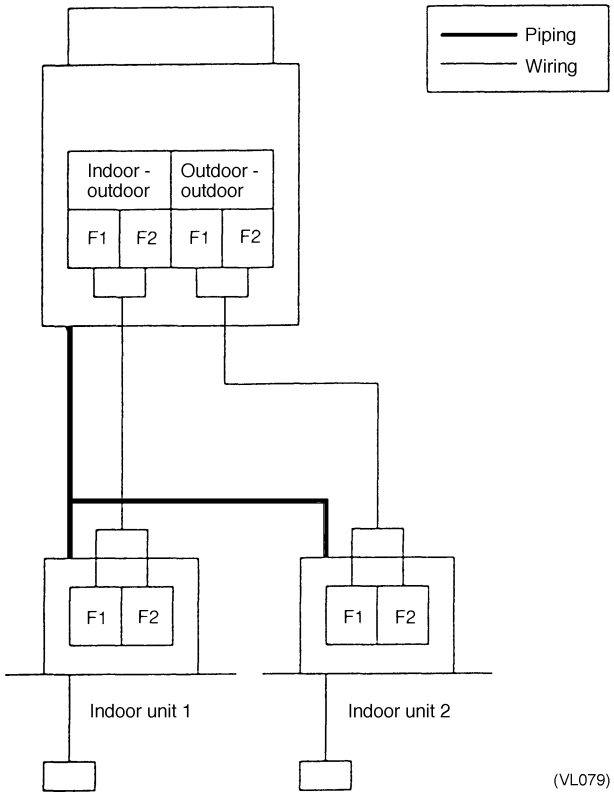
4.1.2 Precautions Concerning the Remote Controller's Mode No.

Mode numbers that are not in the list but can be set may be displayed by the remote controller.
Do not change settings, not included in the list. If so, we may not be able to guarantee operation.

5. Typical Wiring Mistakes

5.1 Typical Wiring Mistakes

One of the indoor units is connected to outdoor-to-outdoor transmission terminals



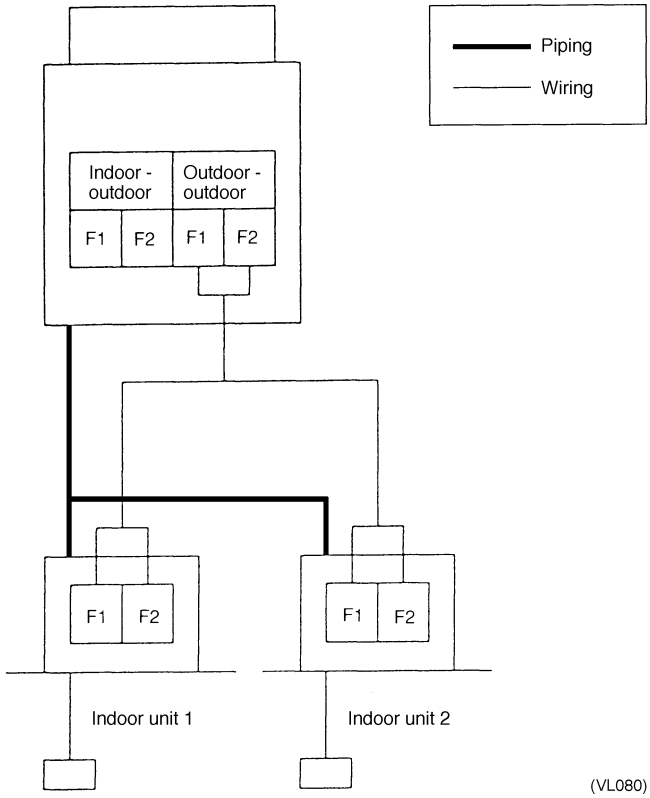
Installation / test operation

Indoor unit 1	Normal
Indoor unit 2	UF malfunction

Other than above

Indoor unit 1	Normal
Indoor unit 2	U4 malfunction or no malfunction display

All Indoor Units Connected to the Outdoor-to-Outdoor Unit Terminal



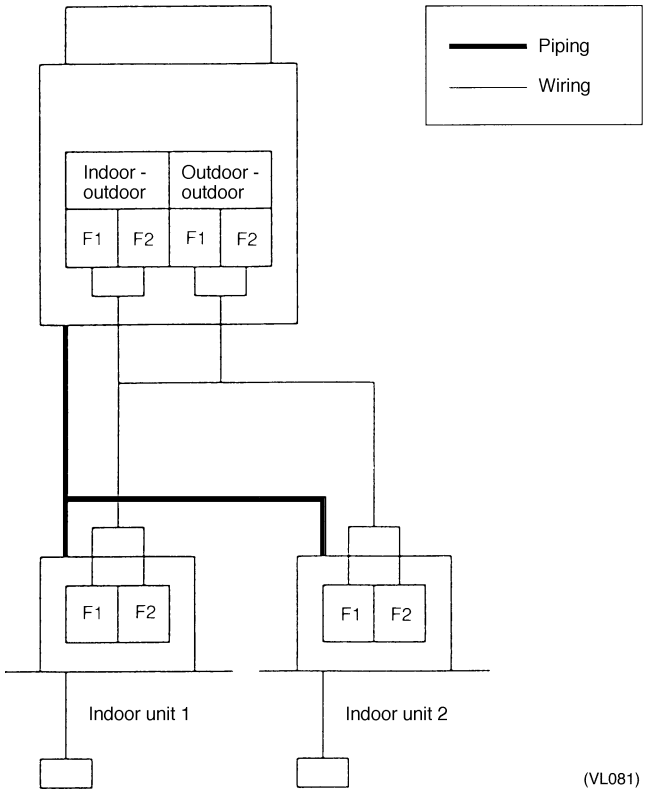
Installation / test operation

Indoor unit 1	UF malfunction
Indoor unit 2	

Other than above

Indoor unit 1	U4 malfunction or no malfunction display
Indoor unit 2	

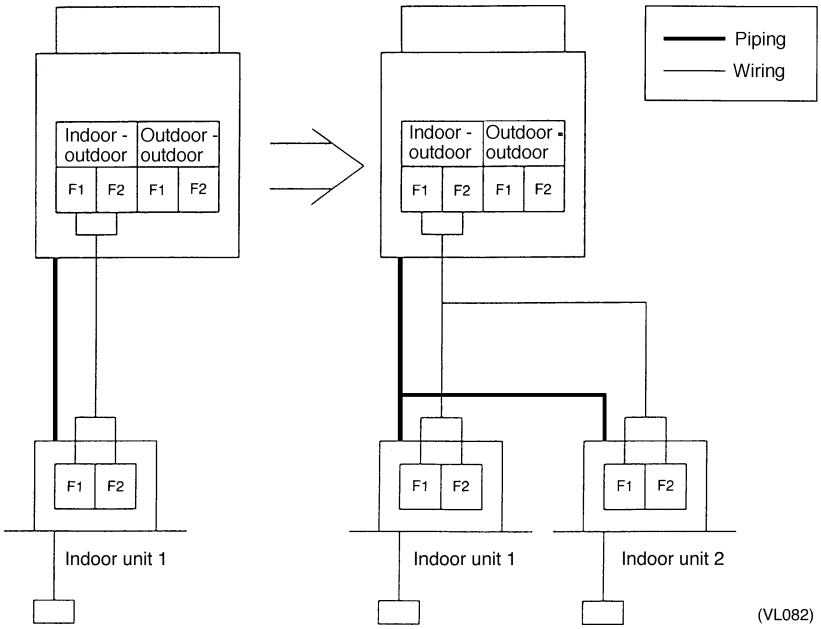
All Indoor Units Connected to Indoor-to-Outdoor and Outdoor-to-Outdoor Unit Terminals



Installation / test operation

Indoor unit 1	U4 malfunction
Indoor unit 2	

Extended Indoor Unit



10 min. after turning power on

Indoor unit 1	Normal
Indoor unit 2	U4 malfunction

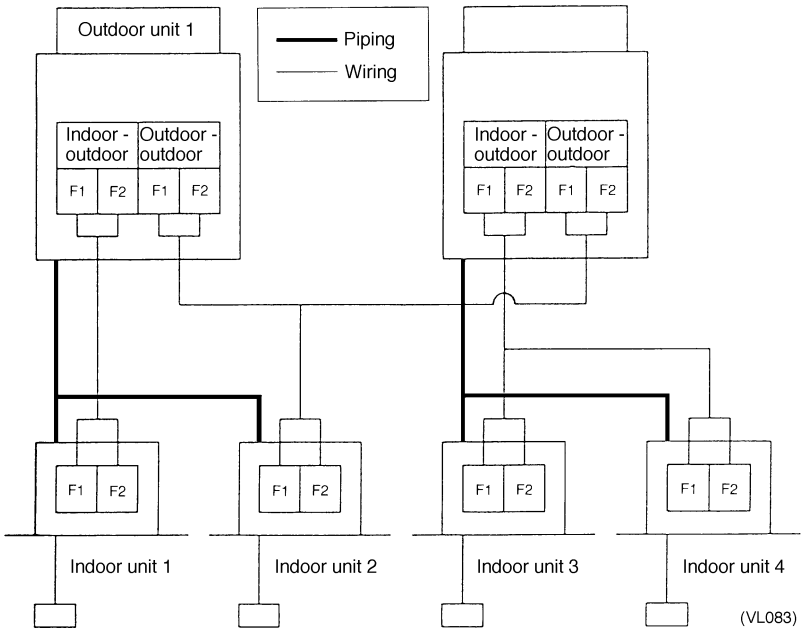
↓

Push and hold RESET button for 5 sec.

↓ After 12 minutes elapse

Indoor unit 1	Normal
Indoor unit 2	Normal

One of the indoor units of outdoor unit 1 is connected to outdoor-to-outdoor transmission terminals



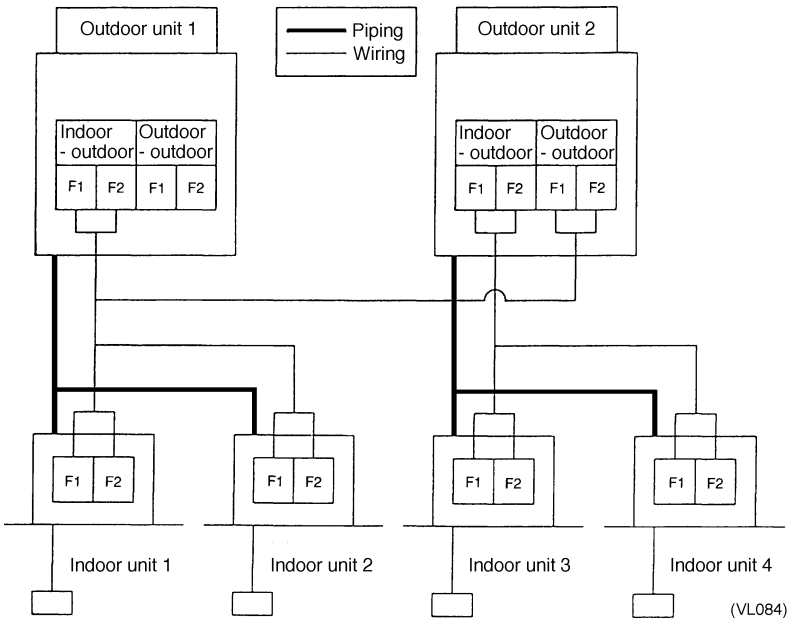
Installation / test operation

Indoor unit 1	Normal
Indoor unit 2	UF malfunction
Indoor unit 3	Normal
Indoor unit 4	Normal

Other than above

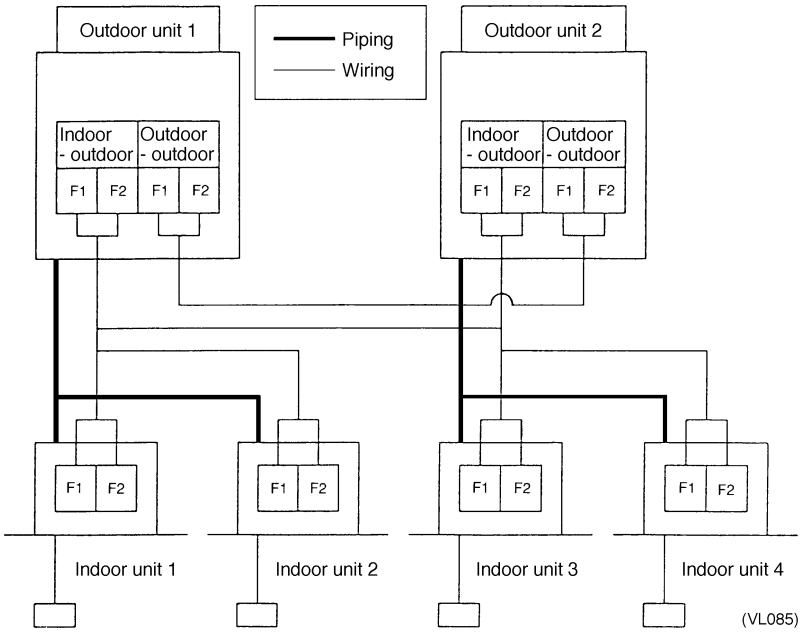
Indoor unit 1	Normal
Indoor unit 2	U4 malfunction
Indoor unit 3	Normal
Indoor unit 4	Normal

The indoor-to-outdoor terminal of outdoor unit 1 and the outdoor-to-outdoor terminal of outdoor unit 2 are connected



Indoor unit 1	Normal
Indoor unit 2	Normal
Indoor unit 3	UH malfunction
Indoor unit 4	

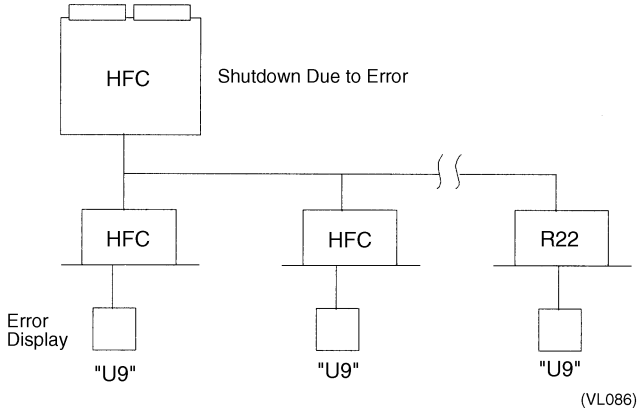
The indoor-to-outdoor terminals of outdoor units 1 and 2 are connected



Indoor unit 1	UH malfunction
Indoor unit 2	
Indoor unit 3	
Indoor unit 4	

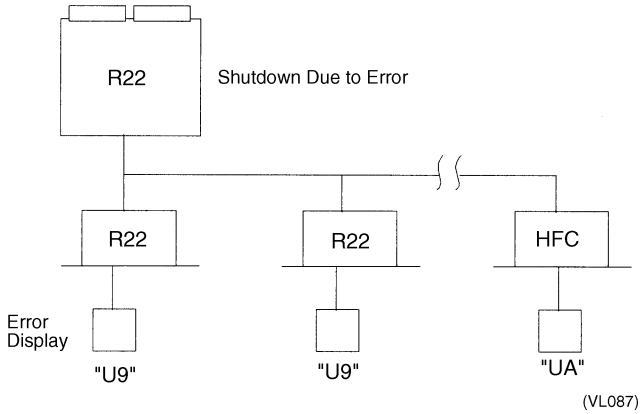
R22 model connection abnormalities

1. When R22 indoor unit is connected to HFC (R407C) system



Reason : Operation disallowed due to insufficient pressure proof in R22 indoor unit.

2. When HFC indoor unit is connected to R22 system



Reason : Operation disallowed to prevent contamination of another system by HFC indoor unit operated previously with R22 system. If HFC indoor unit that was operated with R22 system is removed and connected to another HFC system, it can contaminate (SUNISO oil etc.) the newly connected HFC system.

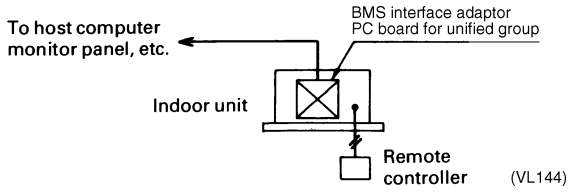
6. Interface Adaptor

6.1 BMS Interface Adaptor for Unified Group (KRP2A51·52)

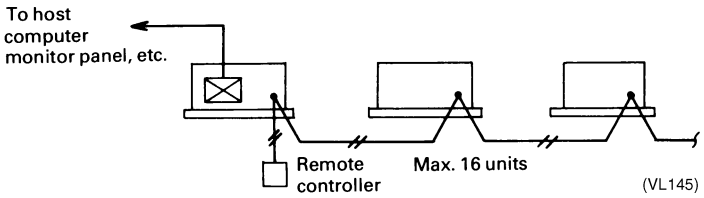
Various remote control (remote control mode, remote temperature setting, display of operation, display of malfunction) can be carried out by mounting this optional accessory in the indoor unit. Up to 64 groups of indoor units can be monitored and controlled all at once by one adaptor PC board. The BMS interface adaptor for unified group cannot however be used in combination with other optional controllers for centralised control (central remote controller, unified on/off controller, schedule timer, etc.).

6.1.1 Outline of System

1. Individual control (controls indoor units individually)

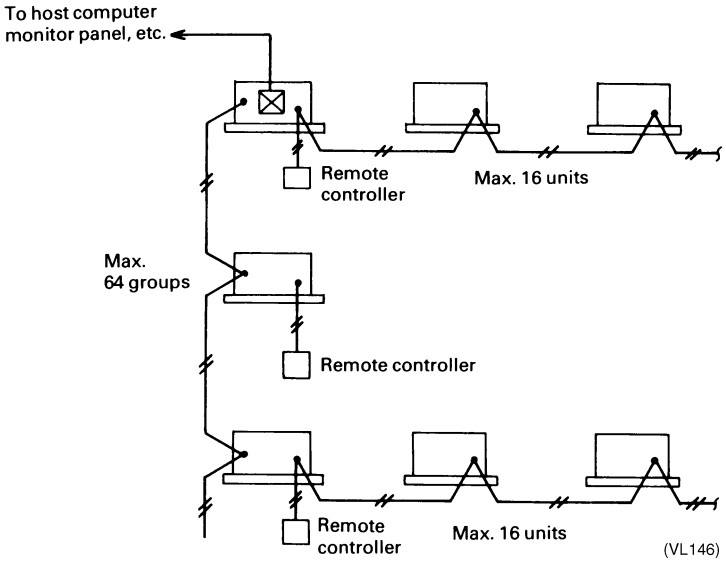


2. Group control (Simultaneously controls group-controlled indoor units [max. 16 units] all together)

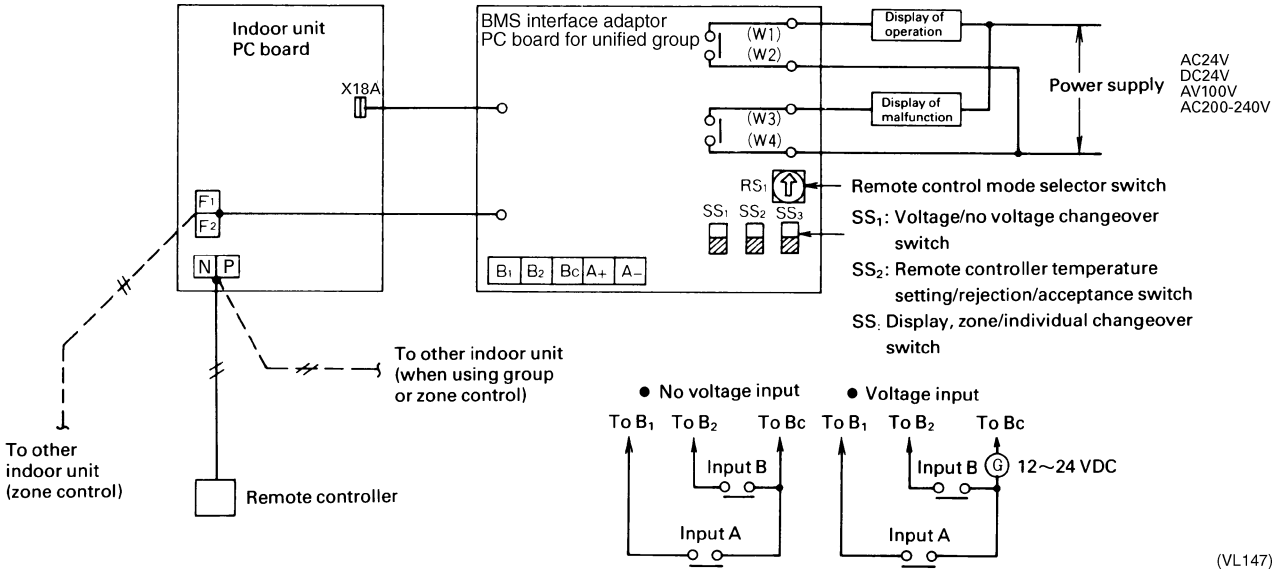


◆ In the case of individual display, install a BMS interface adaptor PC board for unified group in the indoor unit.

3. Zone control
   Simultaneously controls up to 64 groups consisting of up to 16 group-controlled indoor units each all together (max. 64 groups × 16 units = 1,024 units).



6.1.2 Wiring



Operation Signal

- Combined use of constant contact (a) and instantaneous contact (a)
- Combined use of voltage 12~24 VDC, no voltage

Control Mode

- Remote control mode selector switch (Control contents differ according to input mode. See the following page for details.)

Display Signal Fetch

- Display of malfunction signal (no voltage contact [a])
- Display of operation (no voltage contact [a])
  Remote temperature setting (Can be set from 16~32°C.)

Note:

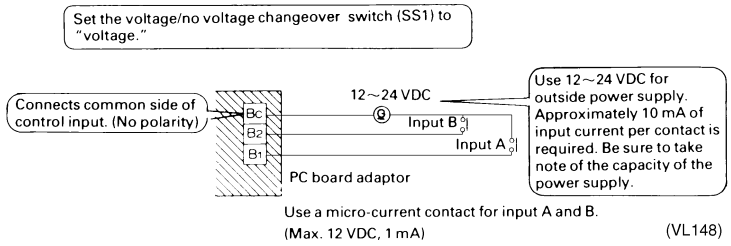
- For voltage input, approximately 10 mA of input current per contact is required.
- In the case of input, use a micro-current contact as the input contact.
- There is no polarity for voltage input.
  Either plus common or minus common can be used for terminal BC.
- Temperature input is resistance value input of 0~135Ω.

6.1.3 Wiring to Outside (Host Computer Monitor Panel, Etc.)

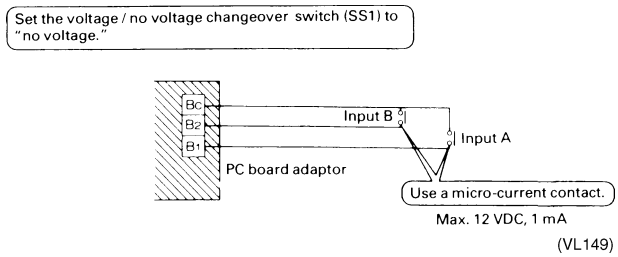
Input for Remote Control (Control Mode)

Wire according to the following procedure depending on whether input is “voltage input” or “no voltage input.”

■ Voltage input

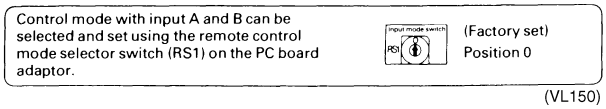

Set the voltage/no voltage changeover switch (SS1) to “voltage.”
Connects common side of control input. (No polarity)
Bc
B2
B1
12～24 VDC
Input B
Input A
PC board adaptor
Use 12～24 VDC for outside power supply. Approximately 10 mA of input current per contact is required. Be sure to take note of the capacity of the power supply.
Use a micro-current contact for input A and B.
(Max. 12 VDC, 1 mA)
(VL148)

■ No voltage input



Wiring specifications: Min. 0.18 mm² sheathed vinyl cord, length within 150 m

■ Setting of remote control mode selector switch (RS1)


Control mode with input A and B can be selected and set using the remote control mode selector switch (RS1) on the PC board adaptor.
Input mode switch
RS1
(Factory set)
Position 0
(VL150)

A) Set to position 0 (direction of arrow) if input is to be disregarded for connection check, etc., or if using as dedicated display function for individual display (connected to any unit other than unit No. 0).
B) If controlling operation using constant input for input A:

Position	Function	Contents of input A when ON	Contents of input A when OFF
1	Remote controller inhibit	ON (remote controller normally inhibited)	OFF + remote controller inhibited
2	Centralised priority	ON + remote controller inhibited	
3	OFF by remote controller enabled	ON + OFF by remote controller only enabled (ON by remote controller inhibited)	
4	Remote controller enabled / OFF	Remote controller only enabled (ON by remote controller inhibited)	

∗ Input B is for forced OFF. When ON, contents become OFF + ON/OFF control impossible by remote controller, and input A is disregarded. When OFF, even when input A is ON, the contents when input A are not achieved; input A must be input over again.

C) If controlling operation using instantaneous input for input A:
(Use instantaneous input of min. 200 msec ON time.)

Position	Function	Contents of input A
5	Remote controller inhibit	(When ON) Operation stops when input A is ON (When OFF) Runs when input A is ON
6	Individual	(When ON) Operation stops when input A is ON (When OFF) Runs when input A is ON (Remote controller normally enabled)

∗ Input B has a forced OFF function (when input B is ON, operation stops and input A is disregarded). When input B is OFF, function of input A is restored.)

∗ If demand controlling using input B:

Position	Function of input A	Function of input B
C	Remote controller inhibit (Same as position 5)	Forced thermostat OFF command
D		Forced temperature shift
E	Individual (Same as position 6)	Forced thermostat OFF command
F		Forced temperature shift

∗ Forced thermostat OFF command

Forces indoor unit to run the fan only.

∗ Forced temperature shift

Raises preset temperature 2°C when cooling, and lowers 2°C when heating.

Note: For zone control, because the units run when RY1 is ON and go off when RY1 is OFF, when in the last command priority mode, some units remain off during operation. At this time even if input A is ON, operation goes off and all units stop running.

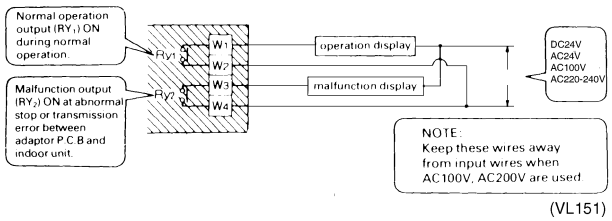
D) If operating by two inputs using instantaneous input for input A and B (Use instantaneous input of min. 200 msec ON time.):

Position	Function	Contents of input A when ON	Contents of input B when ON
7	Remote controller inhibit	ON (remote controller normally inhibited)	OFF + remote controller inhibited
8	Centralised priority	ON + remote controller enabled	
9	OFF by remote controller enabled	ON + OFF by remote controller only enabled (ON by remote controller inhibited)	
A	Remote controller enabled / OFF	Remote controller only enabled (ON by remote controller inhibited)	
B	Individual	ON (remote controller normally enabled)	OFF (remote controller normally enabled)

Note: With positions 7~A, if constant input is used there is a forced OFF function (input A disregarded). With position B, constant input cannot be used for input B.

Display Signal Fetch

Normal operation output terminals (W1, W2) and malfunction output terminals (W3, W4) are no voltage, constant contact output.
(Allowable current is 10 mA~3 A per contact.)

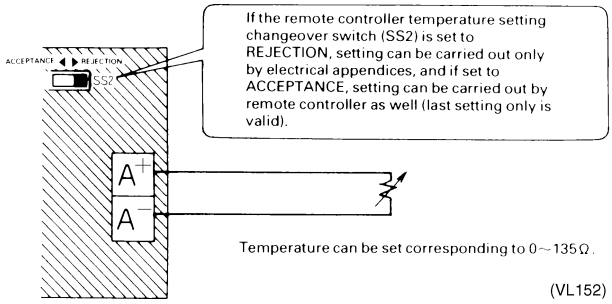


Output for each system is as given in the table below.

Output / System	Both RY1 and RY2 OFF	Only RY1 ON	Only RY2 ON
Individual control or individual display	OFF	Normal operation	Stop due to malfunction or transmission malfunction between adaptor PC board and indoor unit
Group control	OFF	All normal operation	Even one unit stopped due to malfunction or transmission malfunction between adaptor PC board and indoor unit
Zone control	All OFF	Even one unit operating normally without malfunction	Even one unit stopped due to malfunction or transmission malfunction between adaptor PC board and indoor unit

Temperature Setting Input

For wiring specifications, we recommend a min. 1.25 mm² sheathed vinyl cord, length within 70 m.


If the remote controller temperature setting changeover switch (SS2) is set to REJECTION, setting can be carried out only by electrical appendices, and if set to ACCEPTANCE, setting can be carried out by remote controller as well (last setting only is valid).
ACCEPTANCE
REJECTION
SS2
A+
A−
Temperature can be set corresponding to 0～135Ω.
(VL152)

The relationship of preset temperature and resistance is as given in the table below.

Preset temperature (°C)	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Resistance (Ω)	0 ~ 3.4	5 ~ 11.6	13.8 ~ 20	22.4 ~ 28.4	31 ~ 36.4	39.4 ~ 44.8	48.2 ~ 52.8	56.6 ~ 61.2	65.2 ~ 69.4	73.8 ~ 77.8	82.4 ~ 85.8	91 ~ 94	99.4 ~ 102.2	108.6 ~ 110.4	117.2 ~ 119.2	125.8 ~ 127	134.2 ~ 140

Note: Resistance given in the table includes resistance of the wiring.

6.1.4 BMS Interface Adaptor PC Board for Unified Group Optional Accessories and Mounting Position

(See adaptor for wiring for details on mounting position.)

Model name	CS-LM	CS-DM CS-FM CS-KM CS-PM CS-EM	CS-UM	CS-TM
Adaptor PC board optional accessories name	KRP2A51	KRP2A51	KRP2A52	KRP2A52
Adaptor PC board mounting box optional accessories name	KRP1B96	—	KRP1B98	
Adaptor PC board and mounting box storage position				KRP1B93

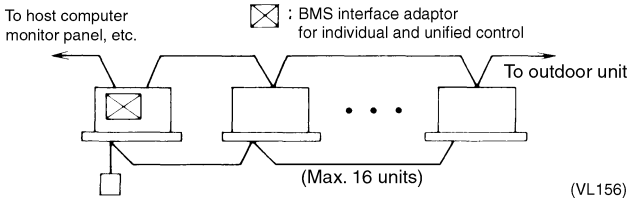
Note: The mounting position of mounting boxes CS-UM is inside the unit if using one adaptor PC board. If equipped with an air cleaner unit, however, the mounting box is mounted on the side of the main body. If using two types of adaptor PC boards, two mounting boxes must be mounted on the side of the main body.

6.2 BMS Interface Adaptor for Individual and Unified Control (KRP4A51 / KRP4A52 / KRP4A53)

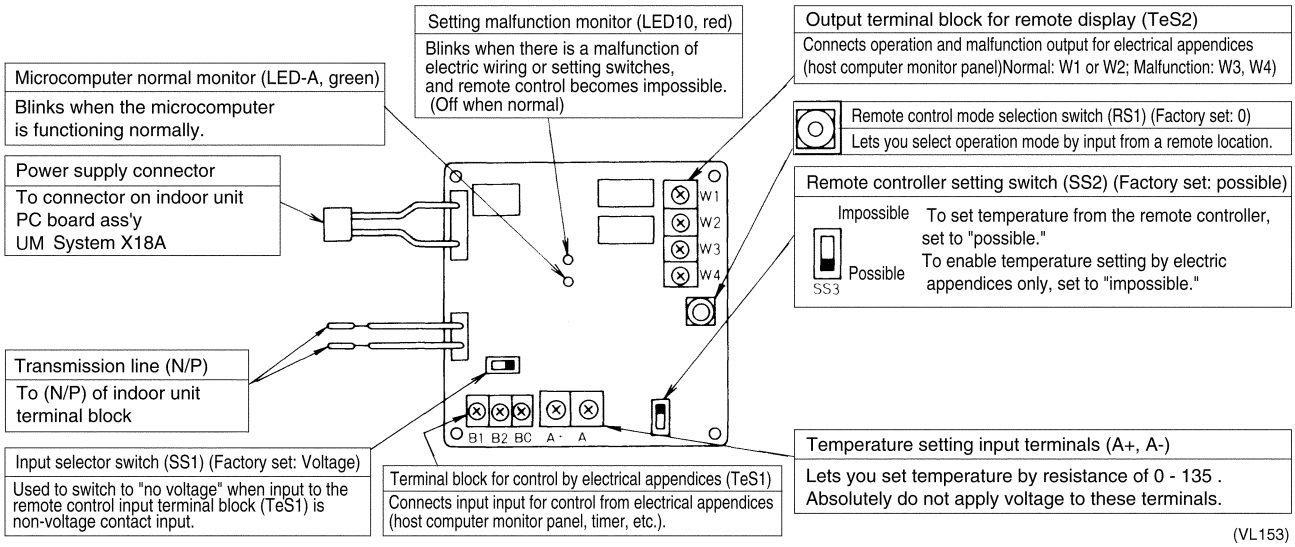
The BMS interface adaptor for individual and unified control cannot be used in combination with a central remote controller, unified ON/OFF controller, schedule timer, data station, etc.

<Objective / use>

The BMS interface adaptor for individual and unified control is used for turning units on/off and setting temperature from a remote location, display of operation, and invoking display of malfunction. A single adaptor enables unified control of groups connected to the remote controller transmission line (N/P).



6.2.1 Part Names and Functions

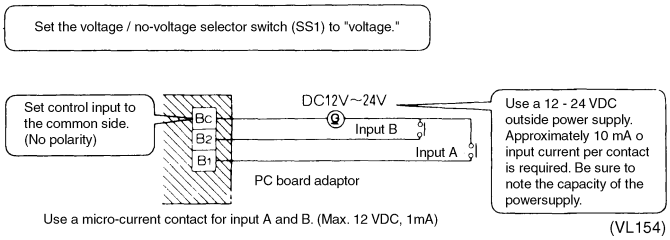

Setting malfunction monitor (LED10, red)
Blinks when there is a malfunction of electric wiring or setting switches, and remote control becomes impossible. (Off when normal)
Output terminal block for remote display (TeS2)
Connects operation and malfunction output for electrical appendices (host computer monitor panel)Normal: W1 or W2; Malfunction: W3, W4)
Microcomputer normal monitor (LED-A, green)
Blinks when the microcomputer is functioning normally.
Remote control mode selection switch (RS1) (Factory set: 0)
Lets you select operation mode by input from a remote location.
Power supply connector
To connector on indoor unit PC board ass'y UM System X18A
Remote controller setting switch (SS2) (Factory set: possible)
Impossible
Possible
SS3
To set temperature from the remote controller, set to "possible."
To enable temperature setting by electric appendices only, set to "impossible."
W1
W2
W3
W4
Transmission line (N/P)
To (N/P) of indoor unit terminal block
B1 B2 BC A- A+
Input selector switch (SS1) (Factory set: Voltage)
Used to switch to "no voltage" when input to the remote control input terminal block (TeS1) is non-voltage contact input.
Terminal block for control by electrical appendices (TeS1)
Connects input input for control from electrical appendices (host computer monitor panel, timer, etc.).
Temperature setting input terminals (A+, A-)
Lets you set temperature by resistance of 0 - 135 .
Absolutely do not apply voltage to these terminals.
(VL153)

6.2.2 Wiring to Outside (Host Computer Monitor Panel, Etc.)

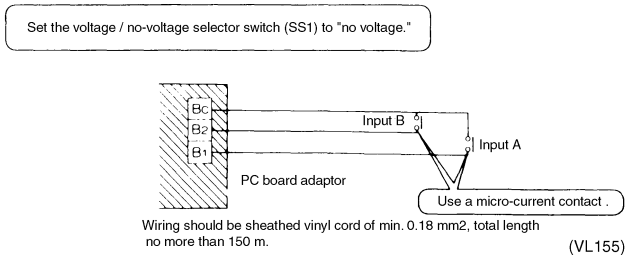
Input for Control by Electric Appendices (On/Off Control)

Wire as described below depending on whether input is “voltage input” or “non-voltage input.”

■ Voltage input


Set the voltage / no-voltage selector switch (SS1) to "voltage."
Set control input to the common side. (No polarity)
Bc
B2
B1
DC12V~24V
Input B
Input A
PC board adaptor
Use a 12 - 24 VDC outside power supply. Approximately 10 mA o input current per contact is required. Be sure to note the capacity of the powersupply.
Use a micro-current contact for input A and B. (Max. 12 VDC, 1mA)
(VL154)

■ No-voltage input

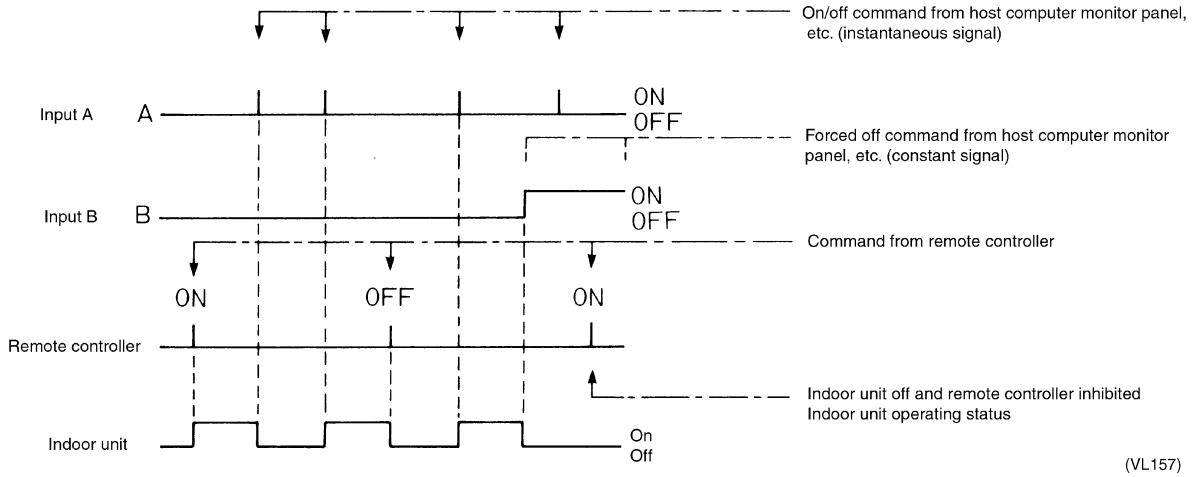

Set the voltage / no-voltage selector switch (SS1) to "no voltage."
Bc
B2
B1
Input B
Input A
PC board adaptor
Use a micro-current contact .
Wiring should be sheathed vinyl cord of min. 0.18 mm2, total length no more than 150 m.
(VL155)

■ Remote control mode selector switch (RS1) setting

Position	Function	Operation by input mode A and B	
		Input A (between B1~Bc)	Input B (between B2~Bc)
0	Disregard input	—	—
1	Remote controller inhibited	Operates by ON and stops by OFF	Stops by ON, remote controller inhibited Disregard input A Input A permitted by OFF
2	Central priority	Operates by ON (remote controller permitted) and stops by OFF (remote controller inhibited)	
3	Remote controller permitted / inhibited	Same as mode 1 (OFF by remote controller always permitted)	
4	Remote controller permitted / inhibited / OFF	ON by remote controller permitted, stops by OFF (remote controller inhibited)	
5	Remote controller inhibited	ON / OFF (cyclic)	
6	Individual	Same as mode 5 (only OFF by remote controller always permitted)	“Stops by ON, remote controller inhibited Remote controller permitted by OFF
7	Remote controller inhibited	Operates by ON	Stops by ON
8	Central priority	Operates by ON (remote controller permitted)	Inhibited by ON (remote controller inhibited)
9	OFF by remote controller permitted	Same as mode 7 (OFF by remote controller always permitted)	Same as mode 7
A	Remote controller permitted / inhibited / OFF	ON by remote controller permitted	Remote controller inhibited by ON
B	Individual	Same as mode 7 (remote controller always permitted)	Same as mode 7
C	Mode 5 + energy efficiency control	Same as mode 5	Forced OFF by thermostat by ON
D	Mode 5 + room temperature setting shift		Room temperature shift operation by ON
E	Mode 6 + energy efficiency control	Same as mode 6	Forced OFF by thermostat by ON
F	Mode 6 + room temperature setting shift		Room temperature shift operation by ON

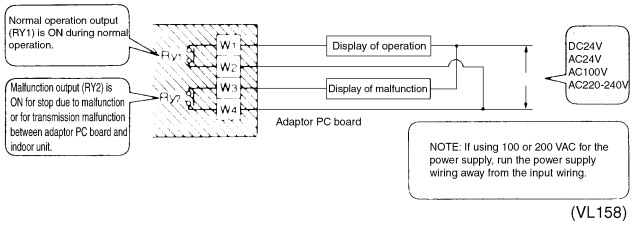
Note: Forced off (disregard input A) is effected when using input B constant input at positions 7~A. Input B constant input cannot be used by B.

◆ Example of when the remote control selector switch (RS1) is set to No. 6
Below are remote control commands relative to input signal and indoor unit time chart



Display Signal Fetch

Normal operation output terminals (W1, W2) and malfunction output terminals (W3, W4) are no voltage, constant contact output.
(Allowable current is 10 mA~3 A per contact.)

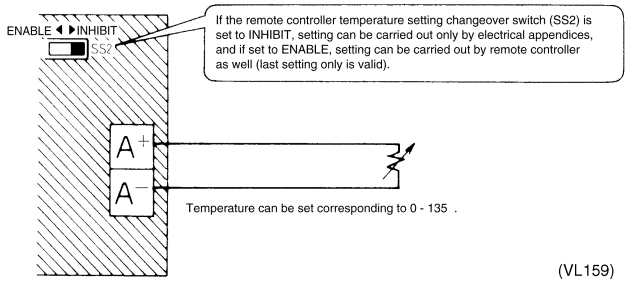

Normal operation output (RY1) is ON during normal operation.
Malfunction output (RY2) is ON for stop due to malfunction or for transmission malfunction between adaptor PC board and indoor unit.
RY1
RY2
W1
W2
W3
W4
Display of operation
Display of malfunction
Adaptor PC board
DC24V
AC24V
AC100V
AC220-240V
NOTE: If using 100 or 200 VAC for the power supply, run the power supply wiring away from the input wiring.
(VL158)

Output for each system is as given in the table below.

Output / System	Both RY1 and RY2 OFF	Only RY1 ON	Only RY2 ON
Individual control or individual display Group control	OFF	All normal operation	Even one unit stopped due to malfunction or transmission malfunction between adaptor PC board and indoor unit

Temperature Setting Input

For wiring specifications, we recommend a min. 1.25 mm2 sheathed vinyl cord, length within 70 m.


ENABLE
INHIBIT
SS2
If the remote controller temperature setting changeover switch (SS2) is set to INHIBIT, setting can be carried out only by electrical appendices, and if set to ENABLE, setting can be carried out by remote controller as well (last setting only is valid).
A+
A−
Temperature can be set corresponding to 0 - 135 .
(VL159)

The relationship of preset temperature and resistance is as given in the table below.

Preset temperature (°C)	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Resistance (Ω)	0 ~ 3.4	5 ~ 11.6	13.8 ~ 20	22.4 ~ 28.4	31 ~ 36.4	39.4 ~ 44.8	48.2 ~ 52.8	56.6 ~ 61.2	65.2 ~ 69.4	73.8 ~ 77.8	82.4 ~ 85.8	91 ~ 94	99.4 ~ 102.2	108.6 ~ 110.4	117.2 ~ 119.2	125.8 ~ 127	134.2 ~ 140

Note: Resistance given in the table includes resistance of the wiring.

6.2.3 Applicable Models and whether Mounting Box is Required or Not

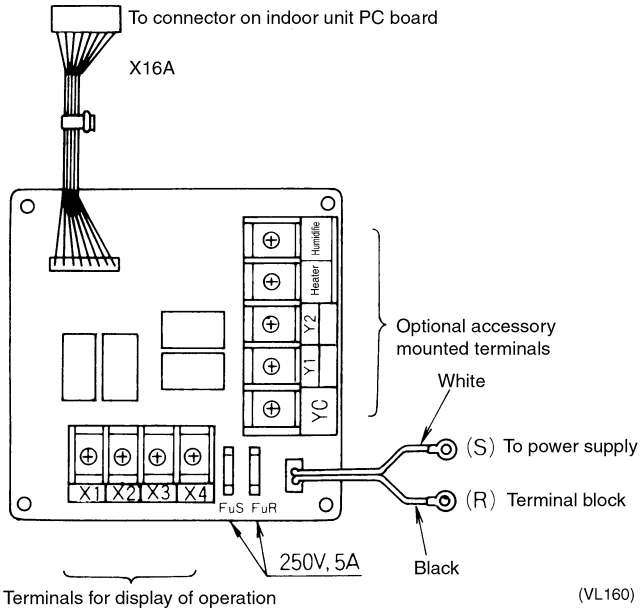
Model name	Adaptor	Mounting box / plate	Mounting position
CS-LM CS-DM CS-FM CS-EM CS-PM/CS-RM CS-KM	KRP4A51	Not required	Mounted inside electrical parts box of main unit
CS-TM	KRP4A52	KRP1B93	Mounted outside main unit
CS-UM	KRP4A53	KRP1A90	Mounted outside main unit

6.3 Signal Output Adaptor PCB for Optional Accessory (KRP1B61 / KRP1B2 / KRP1B3)

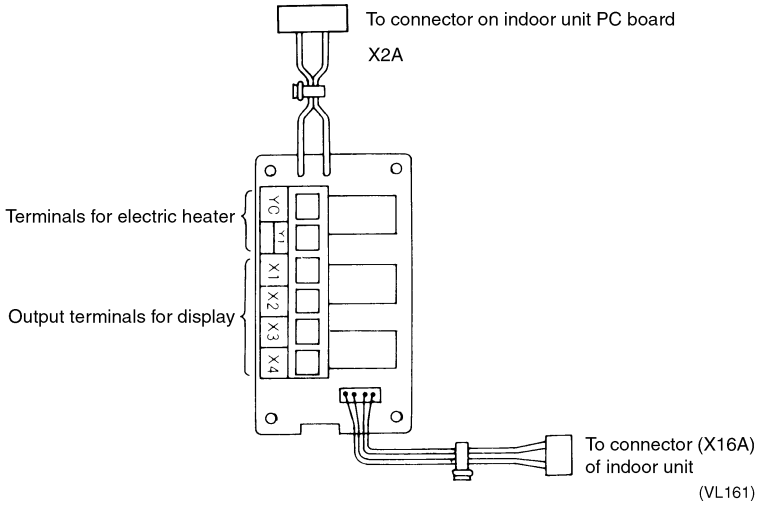
<Objective / use>
Enables you to fetch compressor and fan operation output when optional accessories (auxiliary electric heater, humidifier, fresh air intake kit [with fan duct]) are installed.

6.3.1 Part Names and Functions

KRP1B61 / KRP1B2



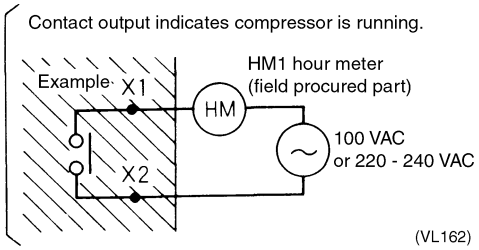
KRP1B3

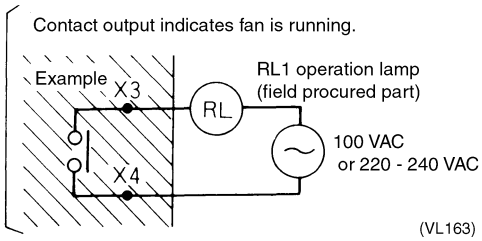


6.3.2 Applicable Models and whether Optional Accessories are Required or Not

Model name	Adaptor	Mounting box / plate	Electric heater	Natural evaporation humidifier	Ultrasonic humidifier	Other required optional accessories	Mounting position
CS-LM	KRP1B61	Not required	○	○	—	—	Mounted inside electrical parts box of main unit
CS-DM			○	○	—	—	
CS-FM			○	○	○	Hot water heater	
CS-EM			○	○	○	Hot water heater	
CS-PM/ CS-RM			○	—	—	—	
CS-TM			○	—	—	—	
CS-UM	KRP1B2	KPP1B98	○	○	—	Duct fan	Mounted inside main unit
CS-KM	KRP1B3	Not required	○	—	—	—	Mounted inside electrical parts box of main unit

6.3.3 Operation Display Fetch



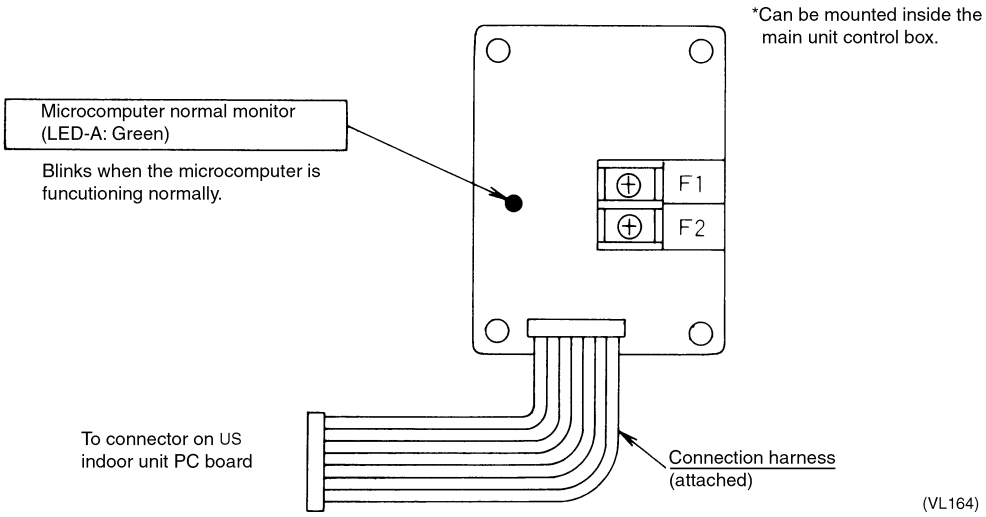


6.4 Interface Adaptor for Urban Split Series (CZ-102AP11P)

<Objective / use>

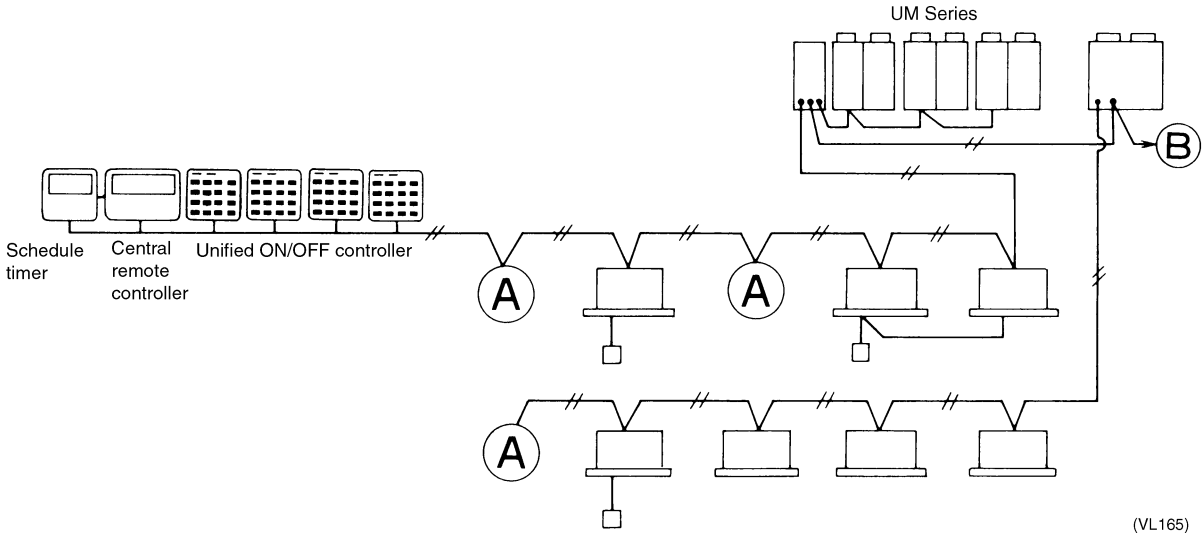
The interface adaptor for US series lets you connect optional controllers for centralised control (central remote controller, unified ON/OFF controller, schedule timer) with US.

■ Part Names and Functions


*Can be mounted inside the main unit control box.
Microcomputer normal monitor (LED-A: Green)
Blinks when the microcomputer is funcutioning normally.
F1
F2
To connector on US indoor unit PC board
Connection harness (attached)
(VL164)

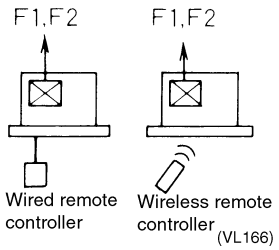
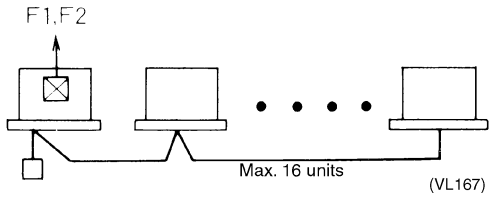
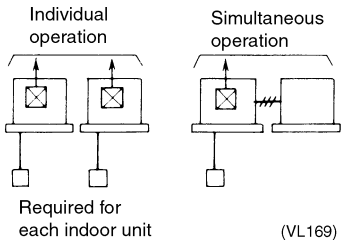
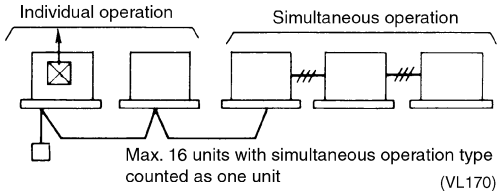
<System Outline>

If using UM System Inverter in common with transmission line, connect either A indoor-to-outdoor unit transmission wiring or B outdoor-to-outdoor unit transmission wiring.



6.4.1 Connection

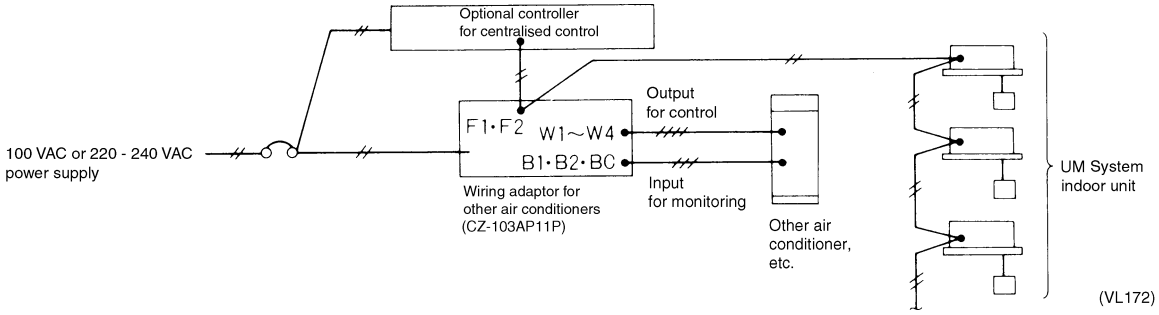
Interface adaptor for US series

	Independent control	Group control
Pair		
Multi		

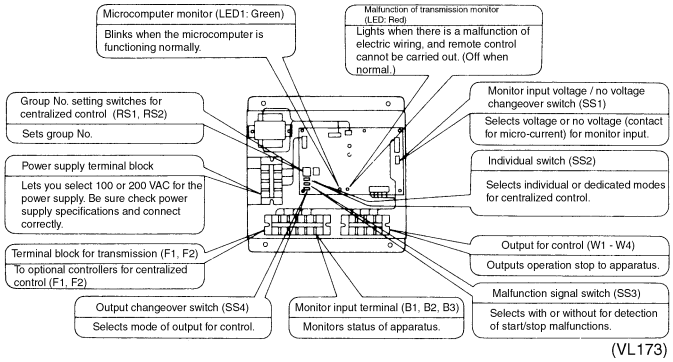
6.5 Interface Adaptor for Other Air Conditioners (CZ-103AP11P)

This optional accessory is a contact input/output interface adaptor for optional controllers for centralised control and apparatus that cannot be directly connected to them. Connecting this optional accessory to an optional controller for centralised control lets you turn the apparatus on/off by optional remote controller for centralised control and monitor normal operation and malfunctions. This optional accessory can be connected with a power consumption counting unit or data station.

6.5.1 Outline of System



6.5.2 Wiring


Microcomputer monitor (LED1: Green)
Blinks when the microcomputer is functioning normally.
Malfunction of transmission monitor (LED: Red)
Lights when there is a malfunction of electric wiring, and remote control cannot be carried out. (Off when normal.)
Group No. setting switches for centralized control (RS1, RS2)
Sets group No.
Monitor input voltage / no voltage changeover switch (SS1)
Selects voltage or no voltage (contact for micro-current) for monitor input.
Power supply terminal block
Lets you select 100 or 200 VAC for the power supply. Be sure check power supply specifications and connect correctly.
Individual switch (SS2)
Selects individual or dedicated modes for centralized control.
Terminal block for transmission (F1, F2)
To optional controllers for centralized control (F1, F2)
Output for control (W1 - W4)
Outputs operation stop to apparatus.
Malfunction signal switch (SS3)
Selects with or without for detection of start/stop malfunctions.
Output changeover switch (SS4)
Selects mode of output for control.
Monitor input terminal (B1, B2, B3)
Monitors status of apparatus.
(VL173)

- Setting of group No. for centralised control
  Set from among 1~4 with setting switch RS1.
  Set from among 0~9 and A~F with RS2.
  Be careful not to duplicate a group No. of other apparatus when setting.

Output for Control

- ON output terminals (W1, W2) and OFF output terminals (W3, W4) are no voltage contact output.
- Contact specifications are 2 A~1 mA for 220~240VAC, and 3 A~1 mA for 5~24 VDC.

Output mode changeover switch SW3		Ry1	Ry2
Constant	Instruction from optional controller for centralised control is ON.	ON	OFF
	Instruction from optional controller for centralised control is OFF.	OFF	ON
Instantaneous	Instruction from optional controller for centralised control is ON.	(ON)	OFF
	Instruction from optional controller for centralised control is OFF.	OFF	(ON)

(ON): Instantaneous output of 1 second ON

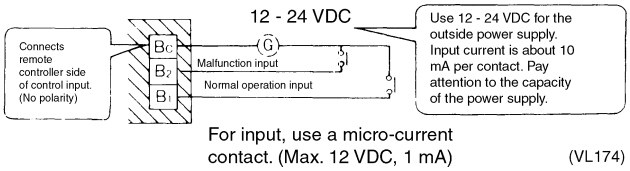
- An adaptor for wiring is required for remote control in order to receive output for control of wiring adaptor for other air conditioners such as ordinary air conditioner, etc.

Input for Monitoring

Wire according to the following procedure depending on whether input is “voltage” or “no voltage.”

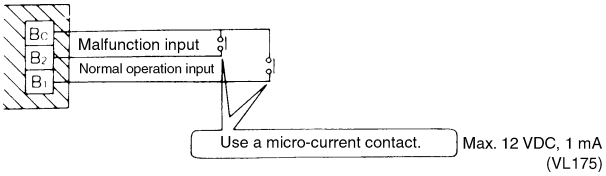
■ For voltage input:

Set the voltage / no voltage changeover switch (SS1) to “voltage.” (Factory set setting complete)


12 - 24 VDC
Use 12 - 24 VDC for the outside power supply. Input current is about 10 mA per contact. Pay attention to the capacity of the power supply.
Connects remote controller side of control input. (No polarity)
BC
B2
B1
G
Malfunction input
Normal operation input
For input, use a micro-current contact. (Max. 12 VDC, 1 mA)
(VL174)

■ For no voltage input:

Set the voltage / no voltage changeover switch (SS1) to “no voltage.”



- If you want to connect output which is to be ON when apparatus is operating normally, disconnect the short circuit wire between B1 and BC and connect output of the apparatus here.
- Connect output which is to be ON when apparatus is malfunctioning between B2 and BC. (You can fetch stop malfunction in the case of stop malfunction.)
- When operating from optional controllers for centralised control, if between B2 and BC is ON or stop malfunction with / without switch (SS3) is set to “with,” in the case of between B1 - BC being ON, optional controllers for centralised control display a malfunction (malfunction code A1).
- After switching from OFF to ON with an optional controller for centralised control, it takes 10 - 30 for the monitor to display a malfunction.

Individual Changeover Switch (SS2)

Switch for toggling between individual mode and dedicated central mode (stop cannot be effected from other air conditioner).
For “without individual,” stop can be effected from optional central controller only.
For “with individual,” stop can be effected from other air conditioner as well.
(Factory set is “without individual.”)

Malfunction Signal Switch (SS3)

Switch for carrying out malfunction detection for stop operation from optional central controller.
In the case of “with stop malfunction,” if operation concerning stop does not follow, the optional central controller carries out display of malfunction.
In the case of “without stop malfunction,” even if operation concerning stop does not follow, the optional central controller does not carry out display of malfunction.
(If SS2 is set to “with last command priority,” this switch becomes inoperable.)
(Factory set is “without stop malfunction.”)

Output Changeover Switch (SS4)

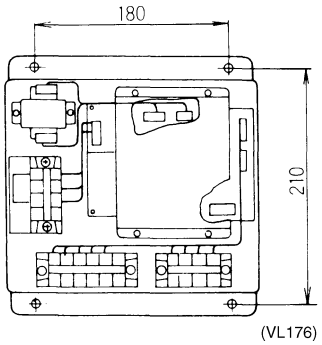
Switch for toggling relay output between constant and instantaneous.
(Factory set is “instantaneous.”)

■ Display of optional controllers for centralised control that make monitor input status by combination of various switches

Setting / Combination	Individual	Stop malfunction	Central display when there is an ON instruction from optional controller for centralised control		
			With ON input	Without ON input	With malfunction input
1	With	With	ON	OFF	Malfunction
2		Without			
3	Without	With	ON	Malfunction	Malfunction
4		Without	ON	ON	Malfunction

6.5.3 Mounting of CZ-103AP11P

- Storage box is field supplied.
- Outer dimensions: 230(W)×230(D)×60(H)

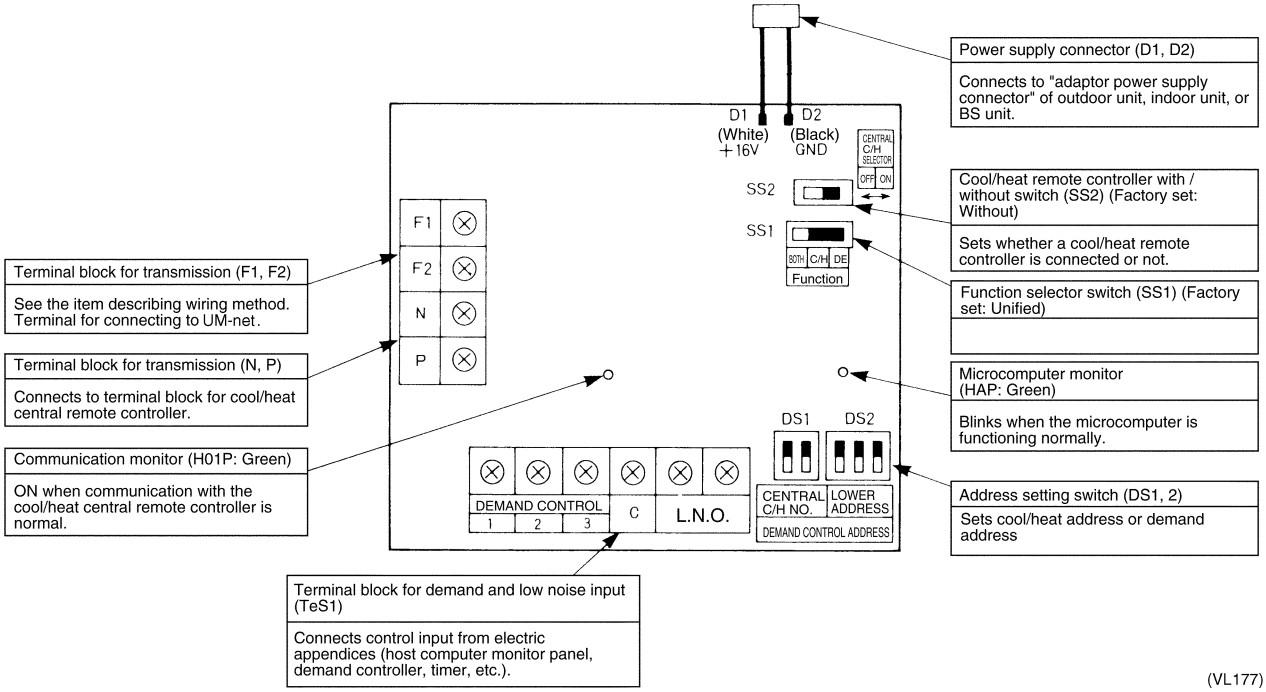


6.6 BMS Interface Adaptor for Outdoor Units (DTA104A51 · DTA104A52)

Objective/use

By adding BMS interface adaptor for outdoor units to HR boxes or indoor units connected in a UM-net, you can simultaneously select cool/heat mode for several outdoor units in the system, and it enables demand control and low noise control.

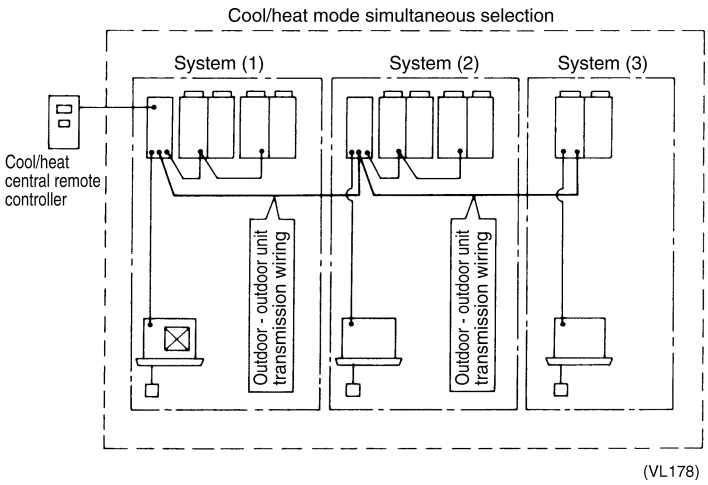
6.6.1 Part Names and Functions


Power supply connector (D1, D2)
Connects to "adaptor power supply connector" of outdoor unit, indoor unit, or BS unit.
D1 (White) +16V
D2 (Black) GND
CENTRAL C/H SELECTOR
OFF ON
SS2
Cool/heat remote controller with / without switch (SS2) (Factory set: Without)
SS1
BOTH C/H DE
Function
Sets whether a cool/heat remote controller is connected or not.
Function selector switch (SS1) (Factory set: Unified)
Terminal block for transmission (F1, F2)
See the item describing wiring method. Terminal for connecting to UM-net.
F1
F2
N
P
Terminal block for transmission (N, P)
Connects to terminal block for cool/heat central remote controller.
Microcomputer monitor (HAP: Green)
Blinks when the microcomputer is functioning normally.
DS1
DS2
Communication monitor (H01P: Green)
ON when communication with the cool/heat central remote controller is normal.
DEMAND CONTROL
1 2 3
C
L.N.O.
CENTRAL C/H NO.
LOWER ADDRESS
DEMAND CONTROL ADDRESS
Address setting switch (DS1, 2)
Sets cool/heat address or demand address
Terminal block for demand and low noise input (TeS1)
Connects control input from electric appendices (host computer monitor panel, demand controller, timer, etc.).
(VL177)

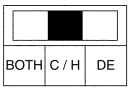
6.6.2 Cool/Heat Mode Unified Selection (For Detailed Example of Wiring, See the Page Describing Cool/Heat Mode Control.)

Note: Refer to “Cool/Heat Mode Switching” on P92, 309

<System Outline>



<Settings of Switches on the PC Board Adaptor>

◆SS1 

C / H — "BOTH" is selected when demand control is carried out at the same time.

◆SS2

OFF

◆DS1·2 — Set the same address as the cool/heat mode address of the function unit.

(VL179)

Note: For Combination Series
Set the SS1 cool/heat selector switch on the function unit to “outdoor.” You must also set cool/heat selector “master” or “slave” by pushbutton switch.

6.6.3 Demand / Low Noise Control

Connecting control input to the adaptor for outside control of outdoor units enables demand and low noise control.

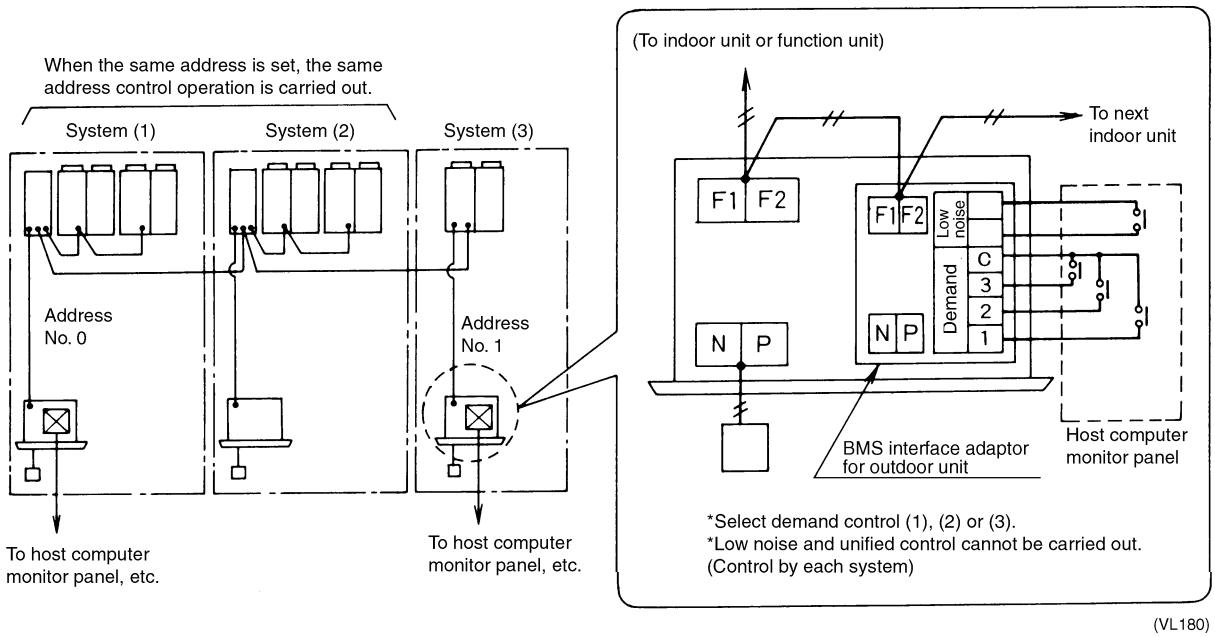
Demand Control (Figures Indicate Demand Rate)

When short circuit between (1) and (C): Approx. 70% as a guideline
When short circuit between (2) and (C): Approx. 40% as a guideline
When short circuit between (3) and (C): Forced fan operation

Low Noise Control (Outdoor Unit)

Running noise can be reduced by 2~3dB by controlling capacity of outdoor unit.

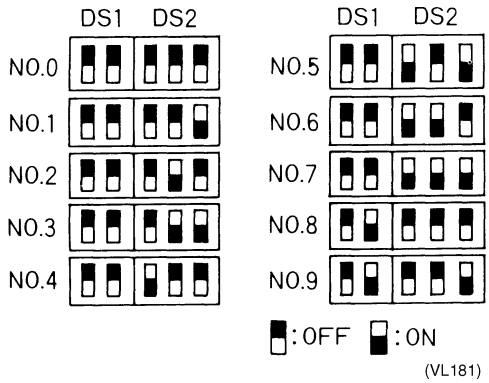
<System Outline>



(VL180)

Common Address Setting (DS1 / DS2)

Decide the address for each control unit from 0~9 and set.



Note:
1. Setting is within 8 groups when using a cool/heat central remote controller. Set from No. 0~No. 7.
2. Be sure to make the address No. of the PC board adaptor described above match the address No. of function unit or outdoor unit (BS unit if using cool/heat simultaneous selection type). (For detailed settings, see the installation manual.)

Note: Refer to the INSTALLATION INSTRUCTION.

Common Control Input Specifications

■ Input signal
Constant contact a
Input current is approx. 12 - 24 VDC, 10 mA per contact.
Use a micro-current contact for the relay contact.
(Max. 12 VDC, 1 mA)

■ Outside wiring specifications
Recommended electric wiring: Sheathed vinyl cord or cable 0.75~1.25 mm² (double core)
Wiring length: Max. 150 m
Run separate from power line in order to prevent malfunction.

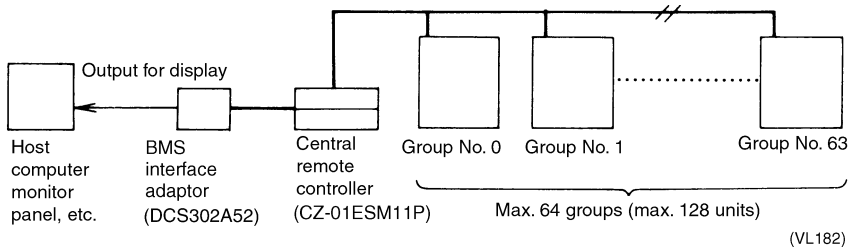
6.7 BMS Interface Adaptor (DCS302A52)

Connecting a BMS interface adaptor to the central remote controller enables unified display on the host computer monitor panel (display of operation and malfunction), and unified control from the host computer monitor panel (on/off commands).

6.7.1 System Outline

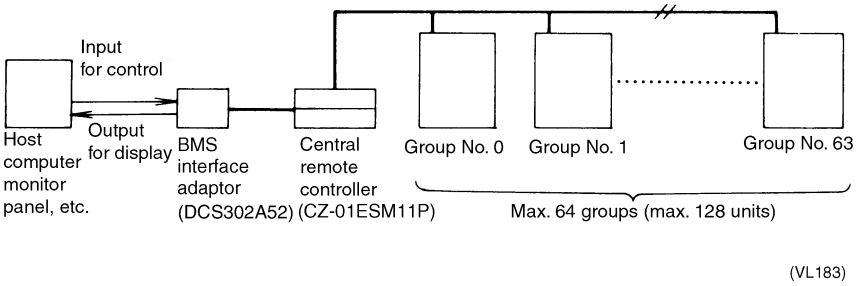
Unified Display

Displays operation and malfunctions of all indoor units controlled by central remote controller on a host computer monitor panel.

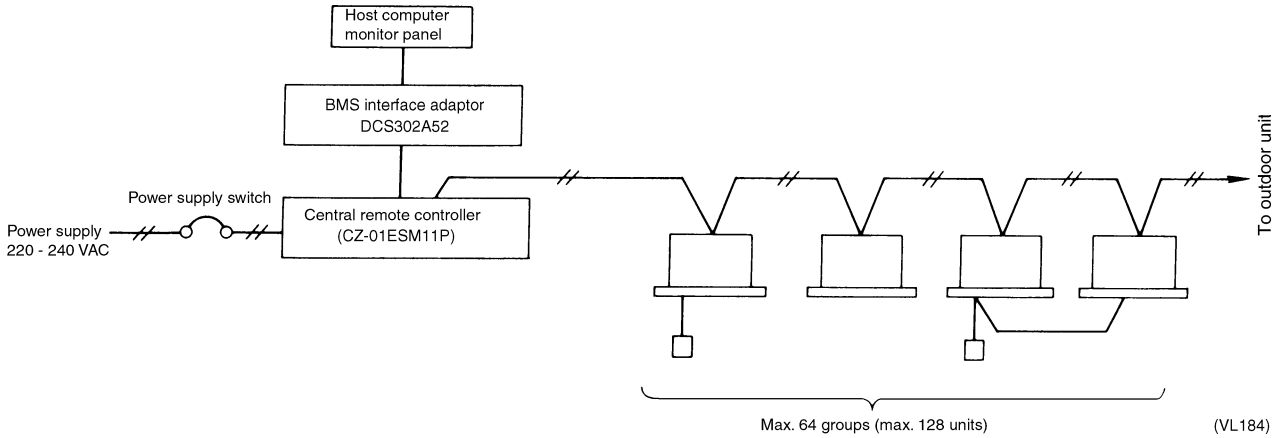


Unified Control

Enables unified display of all indoor units controlled by central remote controller and unified ON/OFF control from a host computer monitor panel.

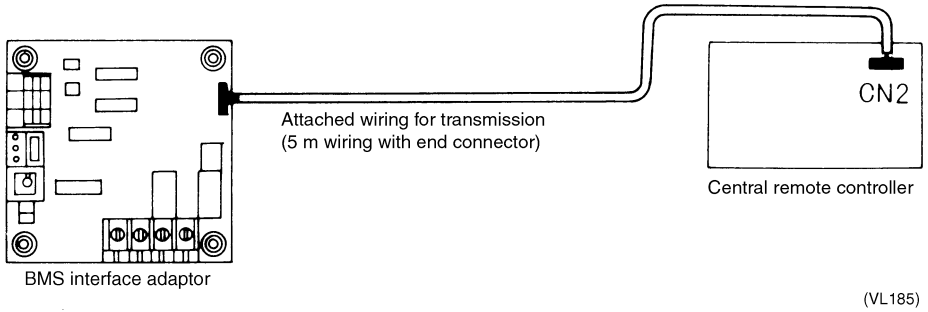


6.7.2 Wiring General



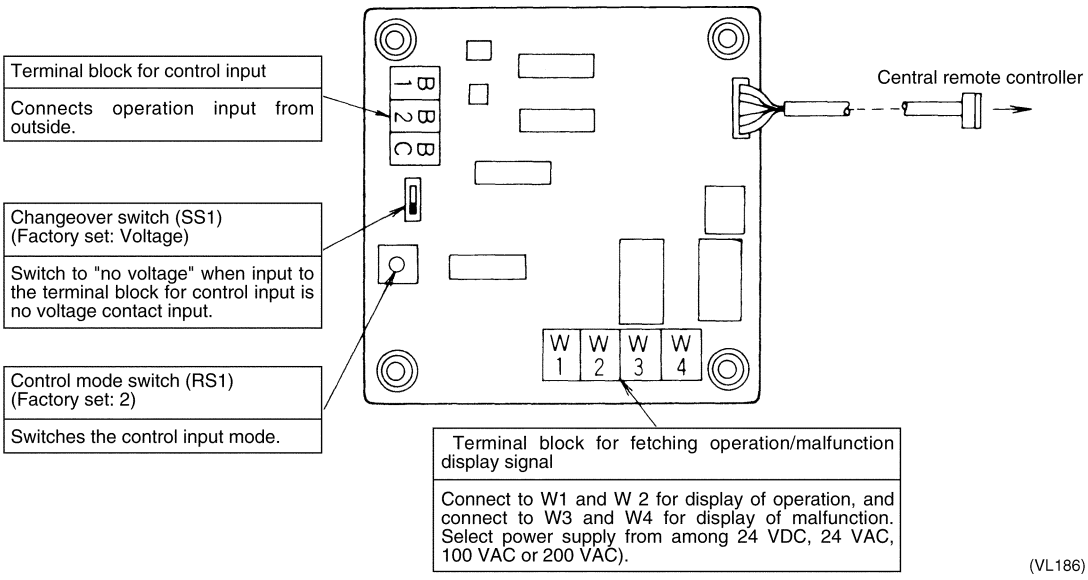
Wiring to Central Remote Controller

Connect the BMS interface adaptor to connector No. CN2 of the central remote controller with the attached wiring for transmission.



6.7.3 Wiring

Part Names and Functions


Terminal block for control input
Connects operation input from outside.
B1
B2
BC
Changeover switch (SS1)
(Factory set: Voltage)
Switch to "no voltage" when input to the terminal block for control input is no voltage contact input.
Control mode switch (RS1)
(Factory set: 2)
Switches the control input mode.
Central remote controller
W1
W2
W3
W4
Terminal block for fetching operation/malfunction display signal
Connect to W1 and W 2 for display of operation, and connect to W3 and W4 for display of malfunction. Select power supply from among 24 VDC, 24 VAC, 100 VAC or 200 VAC).
(VL186)

External Control Input (Wiring to Host Computer Monitor Panel, Etc.)

Specifications of wiring for transmission

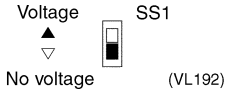
◆ 0.75~1.25 mm² sheathed vinyl cord or cable (double core), Max. length 150 m

6.7.4 Control Input (Unified ON/OFF Control)

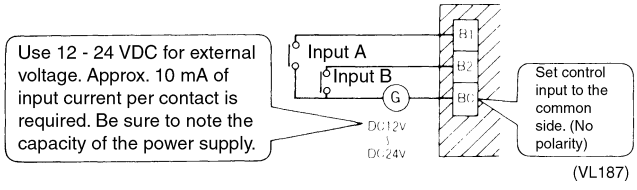
Wire as described below according to whether input is “voltage” or “no voltage.”

Contact a Input for Both Input A and B (Voltage)

Set the changeover switch (SS1) to “voltage.”
(Factory set: Voltage)

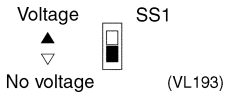


■ The black part shows the position of the switch.

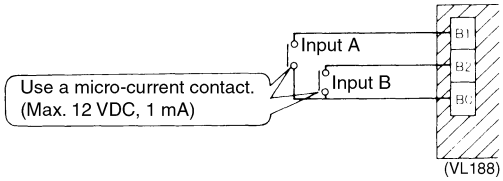

Use 12 - 24 VDC for external voltage. Approx. 10 mA of input current per contact is required. Be sure to note the capacity of the power supply.
Input A
Input B
G
DC12V
DC24V
B1
B2
BC
Set control input to the common side. (No polarity)
(VL187)

Contact a Input for Both Input A and B (No Voltage)

■ Set the changeover switch (SS1) to “no voltage.”
(Factory set: Voltage)



■ The black part shows the position of the switch.



6.7.5 Control Mode Switch (RS) Setting

You can select control mode at input A and B with the control mode switch on the PC board adaptor.
(Factory set: 2)

1. If you want to disregard input for wiring check, set to position 1 (direction of arrow).
2. If operating using input A for constant input:

Position	Input A
2	Unified ON by switching from OFF to ON
	Unified OFF by switching from ON to OFF

∗ Input B is disregarded.

3. If operating using instantaneous input for input A and input B, use instantaneous input of at least 400 msec ON time.

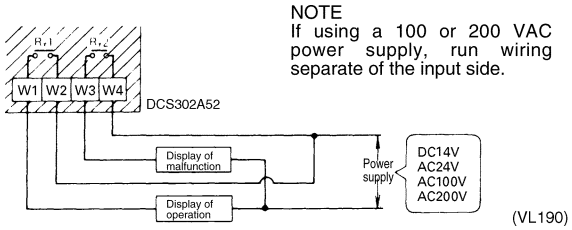
Position	Input A	Input B
3	ON: Unified ON	ON: Unified OFF

Set all switches before turning on the power supply.

External Control Input (Wiring to Host Computer Monitor Panel, Etc.)

■ Fetching the display signal

Normal operation output terminals (W1, W2) and malfunction output terminals (W3, W4) are for contact output with no voltage. (Allowable current per contact is 10 mA~3 A.)

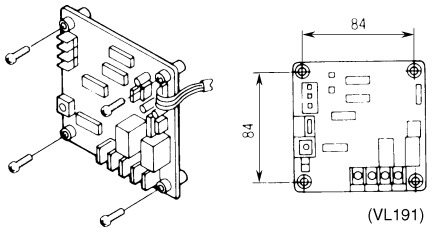


Output is as described below.

RY1 and RY2 both OFF	RY1 only ON	RY2 only ON
All indoor units are stopped.	No malfunction has occurred and at least one unit is operating.	At least 1 unit has stopped due to malfunction, or a malfunction of transmission has occurred between central remote controller and indoor unit.

6.7.6 Installation of DCS302A52

- Install inside the control panel in the same place as the central remote controller in the field. (Length of attached wiring is approx. 5 m.)
- Fasten securely with the attached screws.



(VL191)

7. Precautions in Servicing The Models with New-type Refrigerant

Compared to the conventional refrigerant R22, the brand-new refrigerant R407C is higher in pressure. The refrigerant oil is also different in type. With this in mind, note that the piping work procedures as well as the related tools and piping materials are partially different than ever before.

Refrigerant	Conventional type	New type
	R22 (single)	R407C (mixed)
Refrigerant oil	Mineral oil (Suniso)	Synthetic oil (ether)
Condensation pressure	1.84MPa	2.01MPa

7.1 Tools Required

Some specific tools are required for servicing the refrigerant line of the new-type refrigerant models. Select the right tools referring to the table below.

Typical tools and materials for piping works and their interchangeability

Name	Work process and application		Interchangeability with conventional tools and materials
Pipe cutter	Refrigerant piping work	Cutting pipes	Interchangeable.
Flaring tool		Flaring pipes	
Refrigerant oil		Applying on flared spots	Specified ether oil, ester oil, alkyl benzene oil or their mixture to be used.
Torque wrench		Connecting flare nut	Interchangeable.
Pipe expander		Expanding pipes at connections	
Pipe bender		Bending pipes	
Nitrogen	Air-tightness test	Inhibiting oxidation in pipes	
Welder		Brazing pipes	
Gauge manifold	Air-tightness test through refrigerant recharging	Vacuum refrigerant charging and running test	Specific tools required for boosting the pressure and preventing impurities from coming in.
Charging hose			
Vacuum pump	Vacuum drying		Interchangeable. (Adapter to be connected to keep the oil from flowing back to the unit during pump shut-down. Pump with anti-backflow function also available.)
Charging cylinder	Refrigerant recharging		Conventional cylinder not allowed because of different refrigerant properties. (Need to weigh with the scale.)
Refrigerant charging scale			Interchangeable.
Gas leak detector		Gas leak test	Specific detector needed. (R134a-compatible detector allowed.)

7.2 Notes for Work Procedures

Brazing connections

- With the new type of refrigerant, much more care must be paid to keep impurities from coming in. In brazing the pipes, be sure to blow the pipe using nitrogen gas.
- In any other connecting works, much stricter process control is needed to prevent impurities from coming into the pipes. For this purpose, take appropriate measures such as covering the pipes and do the vacuum drying.

Flaring work

- Chamfer (file) the pipe ends as specified. Be very careful not to allow cutting to come into the pipes.
- To avoid leak, apply a proper amount of refrigerant oil over the inner and outer surfaces of each flared section. As the refrigerant oil, be sure to use synthetic oil (ether oil, ester oil, alkyl benzene oil or their mixture).

Charging refrigerant

- Be sure to charge the new-type refrigerant in liquid phase via the service port of the liquid-side stop valve (outdoor unit). At this time, give vacuum drying with a vacuum pump. Never try the air purging.

Air-tightness test

- Be sure to conduct air-tightness test.

Caution For servicing the models with the new-type refrigerant, strictly follow the above instructions and precautions. Otherwise the system may get in trouble. For details on handling the new-type refrigerant and the related work procedures and tools, refer to the Installation/Test Run Manual published by MATSUSHITA.

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